

SOUND BODIES

FOR

OUR BOYS AND GIRLS

By WILLIAM BLAIKIE

AUTHOR OF "HOW TO GET STRONG, AND HOW TO STAY SO"

WITH ILLUSTRATIONS

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P R E F A C E.

A LITTLE book published awhile ago, called "How to Get Strong, and How to Stay So," which urged the need and ease of physical culture on the public at large, has been widely and favorably received, both in this country and in Europe. Many newspapers—religious and secular—have urged that some of the suggestions therein be embodied in a manual arranged especially for school use. The design of the present manual is to meet that demand. Safe and simple exercises are shown. Many of these are familiar to gymnasts and athletes, but are not (nor is the effect of them) known to most boys and girls. Practised daily, they will aid in building better bodies. Their effect on the mind will also be favorable. For a sensible education of the body causes the blood-making machinery to make good blood instead of poor. This good blood is sent to the brain, and fits that organ to do more and better work, without risk, than it can do when fed by a poor article. The heart, the lungs, and all the other vital organs, are also likely to be kept healthy and vigorous, from being supplied with this good blood, and by a rational use of the muscles daily, yet without overdoing them. One who is trained in this way will safely pass the overwork of the brain and nerves which to-day breaks down so many useful, but physically untrained, men and women, while they should still be in their prime, until nervous exhaustion has become a disorder familiar to almost every physician in the land.

The aim has been to leave no muscle undeveloped, but to call attention to a few exercises for each part of each limb, and all parts of the body. They are free from risk, are not severe enough to overdo, and can be learned almost in a moment. They can be practised in a brief interval between other studies, right in the

school-room, under the eye of the teacher. They call for no costume, no expensive apparatus. Indeed, they will cost practically nothing. The effect of each is shown in a way which every boy and girl can easily understand as they go along, and which they will be very likely to appreciate as well. There is also home-work; the parents can look to this. They can see also that the pupil has good food, ample sleep, and no stimulants. If the pupils will also make sure of their hour or more every day of vigorous out-door work, no matter what the weather is, they will come up to manhood or womanhood well-built, hearty, and enduring, and hence qualified physically to stand the wear and tear of almost any calling in which they may engage. Thus, as the pupils advance day by day, and year by year, in fitting their minds for present and future usefulness, they will at the same time be building and strengthening their bodies, and so doing much to secure both bodily vigor and its companion, sound health, which Emerson says is the first wealth.

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SOUND BODIES

FOR OUR BOYS AND GIRLS.

PART I.—PREPARATORY LESSON.

SECTION I.

INTRODUCTION.

WHY are so many boys and girls not erect? Look in almost any school and you see that many of the pupils, whether sitting or standing, are never straight. Heads are forward; shoulders double over a little, sometimes a good deal; chests incline to droop, and grow flat. Fine, full chests, and an easy, graceful carriage, are rare.

As the pupils get older, these faults, instead of going away, grow worse.

Can this be helped? Is there any way to make a crooked boy or girl straight? Take a slim, angular boy, for instance, whose father is round-shouldered and flat-chested—and perhaps his mother, too: can he become straight, like a soldier?

Yes, in many ways. Let him wear a collar of stiff paste-board or sole-leather an inch high at the back and three inches high in front, and see how soon he will get his chin up, and his chest—what there is of it—out. Make him walk two miles a day, with a dozen pounds of glass or china-ware on a tray on top of his head, and which he must pay for if he breaks, and now let him slouch forward—if he dare. Slap

the backs of his hands together as high up over his head as he can reach, holding his head well back. Do it a thousand times daily, and see if it does not take the crook out of him.

But must he do some one of these unpleasant things before he can get straight? Not at all. There are far easier ways just as handy and as sure. Here is one of them :

Directions. — 1. Stand about four feet apart in the aisles, with arms folded behind you, and with one foot about eight inches in front of the other.

2. Now draw the head back, and tip it as far down behind you as you can.

3. Hold the chin up high, as in Fig. 1.

4. Rest there a moment; then stand up straight again.

5. Repeat this exercise six times.

CAUTION.—Breathe deep, full breaths all the time; indeed, always, when exercising, breathe slowly, and as large breaths as you can.

That is enough the first morning. In the afternoon again repeat this exercise six times. But this is very easy. Why not do more than six? Because, while it is easy for some, it is not so easy for others. Also, because it is a common mistake with beginners to



Fig. 1.

work too hard at first, and so they get lame and sore in the muscles they overwork, when, if they would begin with only a little exercise each day the first week, and then do more the next week, and more yet the third, their muscles would gradually get used to the work, and would be all the time getting stronger, so that in a month they could work almost as hard as they liked, and not be hurt by it at all. However, if the muscles do get sore, that is a small matter, and usually in a day or two the ache goes away, and does not come back.

Questions.

1. Name three uncomfortable ways of helping to make a crooked boy or girl straight.
 2. Now describe one easy way of doing the same thing.
 3. How far apart should the pupils stand in this exercise ?
 4. How should you breathe during it ?
 5. What mistake do people often make when they begin to exercise ?
 6. How can they avoid becoming lame and sore, and still keep getting stronger all the time ?
-

SECTION II.

GETTING STRAIGHT AND ENLARGING THE CHEST.

What has this tipping the head back done ?

Several things. It has set the back of the neck at work—for there are muscles in the back of the neck which draw the head backwards. So it has helped to make the back of the neck strong ; and shapely, too. Also it has thrown the chin up high.

Well, what does that do ?

Why, *you can not raise your chin high up without lifting the whole front of your chest at the same time.*

Try it and see. Hollow your chest and waist in, drawing your chin down, and leaning your head over forward, so that

you look down at your feet. Sit, stand, or walk habitually with your chin down in this way, and you will soon cramp your lungs and stomach till, by-and-by, you will get weak. Yet hundreds of thousands of people, whose work keeps them indoors, sit so for the greater part of each day. But now raise the chin up as high as you can, until your eyes look up at the ceiling right over your head. Hold your chin that way a moment. You feel at once that your chest stands out fuller than usual. Stand before a glass and do the same thing, and you will see how it raises and expands your chest, and makes it stand out full and well. Or, put your hand on the front of the lower ribs, and, as you draw your chin up, you will at once feel your whole chest swelling outward and forward.

In short, whatever draws your chin downward—unless the head is held far back at the same time—tends to make your chest flat and small ; while whatever lifts the chin well upward, is sure to help make your chest large and full. All your life it will pay to know this by heart.

And what good does it do to make the chest large and full ?

It not only improves its looks, and so also the looks of its owner, but it makes the lungs inside of the chest larger and stronger, and thus helps to keep away consumption and other lung disease, and so, often, to save one's life.* It also gives

* Dr. Morgan, in his English "University Oars," on this point says : "An addition of three inches to the circumference of the chest implies that the lungs, instead of containing two hundred and fifty cubic inches of air, as they did before their functional activity was exalted, are now capable of receiving three hundred cubic inches of air within their cells ; the value of this augmented lung accommodation will readily be admitted. Suppose, for example, that a man is attacked by inflammation of the lungs, by pleurisy, or some one of the varied forms of consumption, it may readily be conceived that, in such an emergency, the possession of enough lung tissue to admit forty or fifty additional cubic inches of air will amply suffice to turn the scale on the side of recovery. *It assists a patient successfully to tide over the critical stage of his disease.*"

the heart, stomach, and other vital organs more room, so that they can work more freely. It makes it easy to sit or stand erect, tones up the general health, helps to prolong life (while cramping the chest tends to shorten it), and it brings a feeling of spirit and vigor, which a delicate or sick person often longs for, but does not know.

Here, then, are one or two ways to help make a boy or girl straight, while others may be suggested later.

Questions.

1. Name four things this tipping the head back has done.
2. If you hold your chin up high, what does that do to your chest?
3. If you sit, or stand, or walk much with your chin drooping forward or down, what will this do to your lungs and stomach?
4. What effect has it on your whole chest to hold your chin up high?
5. And what good does it do to make the chest large and full?
6. What effect has it on the heart, stomach, and other vital organs?
7. How does it affect health and life?
8. What does Dr. Morgan say that a large chest will do for one who has pleurisy or any disorder of the lungs?

TO THE TEACHER.—After the pupils have recited the lesson, let them stand up and practise the exercise it describes—the teacher offering any hints likely to help them perform it correctly.

Fifteen minutes' practice in school each day will be enough. Divide this period among such exercises as have already been learned, until the time expires. When so far along that time can be spared for only a part of the old exercises in addition to the new, it will be well to select one exercise out of each set learned until that time, thus keeping up the progress of *each* part, of body and limb, instead of using only one or two. For instance, if the class has reached the "Exercises for the Upper-back," they might divide the first few minutes between "Twirling" for the forearm, "Double Curling" for the biceps muscles, one of the "Back-arm Exercises," one of those for the "Front of the Shoulder," and one of those for the "Side of the Shoulder," the teacher choosing different ones on different days, thus giving each part work to do, and so making progress in each all the time. At the reviews they can go over all the exercises they have learned, if necessary taking several days to do them all.

PART II.—THE ARM.

SECTION I.

TO MAKE YOUR FORE-ARMS STRONG.—FIRST FORE-ARM EXERCISE, OR GRIPPING.

Is there no way to make such boys and girls strong also? For a slim and poorly-built boy or girl may learn to walk erect almost as well as a well-built or hearty one. But that is not enough. They would like to be strong also, if they could. But can they? Let us see.

First let us have a name or two. *The hand*, of course, every one knows; also *the wrist*. But the part of the arm between the elbow and hand—what is the name of this? This is called the *fore-arm*. And the part of the arm above the elbow? Let us call this *the upper-arm*.

We will observe shortly that making the arms large and strong helps to make much of the body strong also. So let us begin with the arm.

Is it possible that a boy or girl with slim, weak arms can make those same arms large, and strong, and well-shaped, by-and-by? We will see. Let us begin with the *fore-arms*.

Directions.—1. Hold your right hand out in front of you, as if you were going to shake hands.

2. Shut it tightly, drawing the thumb and each finger in as closely as you can; in other words, shut your fist.

3. Now open it till each finger is out straight again.

4. Repeat this exercise twenty times with each hand.

Why, that is easy enough. Well, if you should do it again, and keep on till you had done it a hundred times, may be it would not prove such play after all. While you are thus shutting and opening your right hand, catch hold of your right fore-arm with your other hand, and feel how it is at work. Why, it seems as if the whole fore-arm was very busy. And so it is. But now just put your left hand on your right arm again, but this time on your right upper-arm, not on the fore-arm. Keep on opening and closing your right hand as before. Why, you can hardly feel the upper-arm move at all. It is pretty plain now that we know one exercise at least which sets the fore-arm at work. Of course, a hundred such grips each day at first will be too many, and will make the fore-arm ache. Twenty each day for the first week will be enough. The second week go on gripping for a whole minute without stopping, and now you will find that fifty such grips—for they must all be vigorous ones—are very little harder to do than twenty were at first.

After the second week, practise this gripping for a whole minute each day right along in school, and as much more out of school as you like.

Questions.

1. What part of the arm is called the fore-arm ?
2. What is the part of the arm above the elbow called ?
3. Describe the First Fore-arm Exercise.
4. What part of the arm does this exercise set at work ?
5. Does it do the same for the upper-arm ?
6. Why not do a hundred grips each day at first ?
7. How many are enough daily the first week ?
8. How long each day should you thus grip during the second week ?
9. What kind of grips should they be ?
10. How many times should you grip daily after the second week ?

SECTION II.

EXERCISE MAKES US WARM.

But see another thing. While you are gripping, look at the veins in the back of your hands and over your fore-arm, and you will notice that they get larger and fuller towards the end of this exercise, and for a while afterwards, than they were when you began.

What does this mean? Well, this vigorous action of the fore-arm has drawn far more blood into these veins than usual. For, although, of course, the blood is moving through our veins all the time, yet, *when we use any muscles vigorously—and much of the flesh on our arms or any part of us is really muscle—the blood at once rushes oftener and more forcibly to the veins in and near the muscles so used.*

Look at the thin, feeble threads of veins in the hand or arm of a person emaciated by sickness. Now notice in the blacksmith's powerful arm and hand how these same veins are full, swollen, and healthy, like little rivers. The difference is very marked.

And this rich, hearty blood of the strong man does something more than merely swell the veins. It makes him warmer.

Observe a man chopping wood on a winter day. So warm does the exercise make him that he will work either in a thin coat, or often in his shirt-sleeves, while a person standing near by him, and not exercising, but simply remaining still, needs, besides a coat, a thick overcoat to keep him warm. But let the chopper stand still a few minutes, and he also soon cools off and needs his coat, thus showing that it is the exercise which keeps him warm. Or, walk fast when you are cold, and see how quickly you become warm from your sudden activity.

Questions.

1. During this exercise, what happens to the veins in your hand and fore-arm?
2. Why do the veins thus get large while exercising the fore-arm?
3. What effect does using any muscles vigorously have on the veins in and near them?
4. Who has the fuller and richer veins, the sick man or the blacksmith?
5. What else does the abundant and hearty blood of a strong person do besides swelling his veins?
6. Give an instance of this.
7. Name another instance, besides the case of the chopper.

SECTION III.

SECOND FORE-ARM EXERCISE, OR TWIRLING.

So far we have had one exercise for the fore-arm—one that can be easily practised at school, at home, or almost anywhere. But the best place for it is the school-room, for here you have company at it, a time set apart purposely for it, and a teacher to aid you in doing it correctly.

Directions.—1. Take a stick, cane, or piece of a broom-handle, of hard wood, about half as thick as your wrist is wide, and as long as your arm.

2. Stand erect, and breathe slowly and deeply, holding the chin as high as you can.

3. Now catch the stick by the end, hold it far out from the body.

4. Twirl it, first far over one way (as in Fig. 2). Then as far over the other way as you can till your finger-nails are turned upward.



Fig. 2.

5. Do this twenty times without stopping.

Twenty times daily will be enough for the first week. Increase the number to forty each day the second week, and to sixty daily after that.

Feel the fore-arm while it is in action, and you will find how firm and strong its muscles suddenly seem.

Questions.

1. Describe the Second Fore-arm Exercise, or Twirling.
 2. How long and how thick should the stick be ?
 3. How should you stand during this exercise ?
 4. How should you breathe ?
 5. How should the chin be held ?
 6. How many times daily should you twirl the stick during the first week ?
 7. How many each day the second week ?
 8. And how many daily after that ?
 9. How do the muscles of your fore-arm feel during this exercise ?
-

SECTION IV.

EXERCISE ENLARGES THE MUSCLES.

Before the first month is past, you will find that you can twirl the stick a hundred times without stopping, almost as easily as you did twenty times at first, before your fore-arm got strong.

But, besides being stronger now, is it also any larger ?

If, before you began these exercises, you had put a tape-measure about it at the largest part—a little below the elbow—and if now, at the end of the month, you measure it at the same place again, you will probably find that it is all of a twelfth of an inch larger than before.

Why, that is not much ! No, not for a year, perhaps ; but it is pretty good for a single month ; and if you can gain that

each month for a whole year, it would amount to a whole inch at the end of the year, enough probably to give you the largest fore-arm of any boy or girl of your age and size in the school—if the others are not steadily using their fore-arms as you are—and to give you the best-shaped fore-arm as well.

In Appendix, Table III., you will see that not one student, but two hundred, each enlarged their fore-arms three quarters of an inch by exercise, not in one year, but in half a year, working only two hours a week, or about twenty minutes a day ; while three men (see Appendix, Table VI.) increased their fore-arms in seven months and nineteen days a whole inch and a quarter.

Of course you must do as much and as hard work with one arm as you do with the other, or the one which does the more work will be stronger and handsomer than its mate.

Very often, indeed, usually in persons who are right-handed, the left arm is weaker and smaller than the right arm—sometimes as much as half an inch smaller—whether you measure it about the fore-arm or about the upper-arm. So left-handed persons will have the right arm the smaller one. In short, *the arm which gets the more work is the stronger*. It is plain what to do in such a case. Give about all the exercise to the weak arm for the first few weeks, until it gets as large and strong as its mate. Then, after it has thus caught up, give each the same kind and amount of exercise daily, so that they will remain of like size and strength.

Questions.

1. By the end of the first month how many times can you twirl the stick almost as easily as you could twenty times at first ?
2. What effect will this first months' work be likely to have on the size of the fore-arm ?
3. How much larger ?
4. How much would this little gain each month make the fore-arm in even one year ?

5. State how much two hundred students in Bowdoin College enlarged their fore-arms in six months by exercise, and how much three soldiers in England enlarged theirs in seven months and nineteen days.

6. If you only exercise with one arm, how will that arm compare by-and-by with the other one ?

7. Which arm of right-handed persons is usually the larger ?

8. Which arm of left-handed persons is usually the smaller ?

9. Why is this ?

10. What should be done to the weaker arm in that case ?

11. After it has caught up with the other arm, what kind and amount of work should you give each arm daily ?

SECTION V.

THIRD FORE-ARM EXERCISE, OR CROSS-TWISTING.



Fig. 3.

Directions.—1. Catch the stick with both hands and hold it out in front of you, as in Fig. 3.

2. Hold the chest well out, and the chin up.

3. Breathe deep, full breaths.

4. Hold the stick as tightly with both hands as you can.

5. Now twist it strongly with your right hand, so as to turn it away from you ; but at the same time twist it with your left hand, so as to turn it towards you.

6. Repeat this exercise three times.

This makes one hand twist it just the opposite way from the other, and thus both hands twist

crossways. *Of course, the harder you twist with one hand, the more work it makes for the other, and the less the stick really moves.*

For most boys and girls three such twists each day will be enough the first week, six the second week, and ten after that.

But they want to be good hard twists, no make-believe affairs. This will take less than a minute each day; but it is grand work for the fore-arms, and will soon begin to increase their size and strength.

Questions.

1. Describe the Third Fore-arm Exercise, or Cross-twisting.
2. How should you stand during this exercise?
3. How should the chin be held?
4. How should you breathe?
5. If you keep twisting the stick harder with one hand, what effect does it have on the other?
6. How many such grips should you take daily each week?
7. Of what kind should they be?
8. How long will they take daily?
9. What will be the effect on the fore-arms?

SECTION VI.

VARIOUS EXERCISES WHICH CALL THE FORE-ARM INTO PLAY.

After the first month is past, and you find that these three exercises are becoming easy, and do not tire you at all, then you are getting your fore-arms strong enough for many kinds of exercise which need good fore-arms. Such is any work where the hands have to grasp a thing firmly or hold it tightly. For example, as in

1. Rowing.
2. Driving a hard-mouthed horse.
3. Carrying a pail of water, a hod of coal, or other heavy weight in the hand.

4. Sword exercise.
5. House-painting.
6. Sawing wood.
7. Pitching hay or grain.
8. Cutting grass or grain with a sickle.
9. Boring with a large gimlet with one hand.
10. Hammering with a heavy hammer.
11. Paddling a canoe.
12. Pulling yourself up on a bar or rope until your chin touches your hands.
13. Lifting any heavy weight from the ground.
14. Pulling on a stout rope, as, for instance, in the game called the "tug-of-war."
15. Climbing up a rope, or peg-pole, with the hands alone.
16. Anything, in short, which uses the hand vigorously and keeps it shut, or partly shut, in gripping or clutching some object, is about sure, if faithfully followed up a little each day, to at length bring you good fore-arms.

These exercises are named here to give the pupils a variety of work from which they can choose the kind that each prefers, or finds convenient for practice out of school.

If each day, in the exercises in school, they will give only the brief time called for above for the First, Second, or Third Fore-arm Exercise—scarcely a minute in all—and then, out of school, will try even only a few minutes of vigorous work at whichever one they like of the Various Exercises which Call the Fore-arm into Play, and most of which, of course, can be done better out of school, they may feel confident that, by the end of the year, they will probably gain from half an inch to an inch in the girth of each fore-arm. This, of course, will make one very satisfactory entry for their "Table of Measurements"* at the end of the school-year.

* See Appendix, Tables VIII. and IX.

Questions.

1. How many weeks should you practise these First, Second, and Third Fore-arm Exercises, before trying harder fore-arm work ?
 2. And what has this month of work at these simple exercises been doing for your fore-arm ?
 3. Name various other exercises which call the fore-arms into play.
 4. Why are these exercises named here ?
 5. If you will spend a minute each school-day during the year at the First, Second, and Third Fore-arm Exercises, and a few minutes daily out of school at some one or more of the exercises named in the list as good for the fore-arms, how much larger may you fairly hope to make your fore-arms, even in one year ?
 6. Must the work done out of school be sleepy or vigorous ?
-

REVIEW.

1. What mistake do people often make when they begin to exercise ?
2. How can they avoid becoming lame and sore, yet keep gaining strength all the time ?
3. How should the chin be held in nearly all exercises ?
4. What effect on the chest has holding the chin up high ?
5. What good does it do to make the chest large and full ?
6. How does it affect the vital organs generally, and also the health ?
7. What does Dr. Morgan say of its effect on one who has any disorder of the lungs ?
8. What do you call the part of the arm below the elbow ?
9. Above the elbow ?
10. Describe the Gripping Exercise.
11. What part of the arm does this set at work ?
12. What effect has this exercise on the veins of the arm ?
13. Who has the richer veins, the sick man or the strong one ?
14. Besides swelling his veins, what else does vigorous exercise do ?
15. Give an instance of this.
16. Describe Twirling.
17. Describe the stick to be used in this exercise.
18. How many twirls should be done daily after the second week ?
19. How do the muscles of the fore-arm feel during this exercise ?

20. What gain will these fore-arm exercises likely effect in one year ?
21. If you exercise with only one arm, what will be the result ?
22. Which arm is usually the larger, the right or left ?
23. Why is this ?
24. What should be done to the weaker arm in this case ?
25. After the arms are of equal size and strength, what kind and amount of work should be given to each daily ?
26. Describe the Third Fore-arm Exercise, or Twisting.
27. How many such twists should be taken daily after the second week ?
28. How many weeks should these three fore-arm exercises be practised before trying harder fore-arm work ?
29. What effect has this first month of work had on the fore-arms ?

30. Name various other exercises which call the fore-arm into play.

31. Should the work be sleepy or vigorous ?

SECTION VII.

THE BICEPS MUSCLE.

Now let us do something for the *upper-arm*.

Take any convenient weight in the right hand—for example, a heavy book, a dumb-bell,* a brick, or a pail of water, though a dumb-bell is the most handy.

Let your right hand, with this weight in it, hang easily at your side. Now raise it slowly and steadily till you get it as near as you can to your shoulder, as in Fig. 4.



Fig. 4.

* All the dumb-bells needed for any exercise mentioned in this manual are : for each boy a pair, each of which weighs about one fifteenth as much as he does ; and for each girl a pair, each weighing about one twentieth as much as she does. They usually cost about five cents a pound.

Keep your right elbow near your body all the time. Now lower the weight slowly till it is at your side.

Raise it again. This time, as you raise it, grasp your right upper-arm in front with your left hand, as in the figure, and feel the muscle at work. While the right arm hangs down, this muscle is soft ; but, as you raise the weight, this muscle begins to swell and harden till the weight gets near your shoulder, and then is larger than ever.

Indeed, this is the chief muscle which raises your hand. Hence it is one of the most useful. Whenever you lift anything enough to bend your elbow, this muscle does much of the lifting. You can scarcely touch your hand to your head, or put food into your mouth, without using this muscle.

Hence this very useful part deserves a little extra notice, so we will call it by its Latin name (the only one in this little book)—the *biceps* muscle.

Now, the heavier the weight you lift to your shoulder, the more this biceps muscle will harden.

Also notice that, while you thus harden it, the back of your upper-arm does not harden at all. This shows that the exercise you are taking sets the biceps at work, but not the rest of the upper-arm.

Let us have, then, a little work for the biceps muscle.

Questions.

1. If you raise any weight in your right hand from your side to your shoulder, what will it do to the front of the upper right arm ?
2. Whenever you bend your elbow, what muscle do you use ?
3. What is the name of this muscle on the front of the upper-arm ?
4. When you lift a heavy weight up to your shoulder with either arm, what effect does it have on the biceps muscle of that arm ?
5. Does it also harden the back of the upper-arm ?
6. Then, if this exercise makes the front of the upper-arm—that is, the biceps—hard, but the back-arm does not get hard at all, what part of the upper-arm does it develop ?

SECTION VIII.

FIRST BICEPS EXERCISE, OR CURLING.

Directions.—1. Take a dumb-bell in your right hand.

2. Let your right hand hang down at your side until the elbow is straight.

3. Stand erect.

4. Hold the chest out full.

5. Keep the chin up high.

6. Breathe a deep, slow breath.

7. Slowly raise the dumb-bell until it is up in front of your right shoulder, as in Fig. 4, page 16.

8. Hold it there a moment.

9. Now lower it slowly to your side again.

10. Repeat this ten times.

11. Rest a minute.

12. Now do the same ten times with your left hand, keeping the chin always up.

Gymnasts call this exercise *curling*.

This will be enough for the first day. Each day the first week curl the dumb-bells ten times, with each hand, without stopping. You may feel like doing it more than ten. But do not, at least in school. For while ten may be easy to you, it may be hard for some of the others.

The second week curl the dumb-bells fifteen times each day, with each hand, without stopping. After that, do it twenty times daily, with each hand, right along.

Not only breathe deeply, with your chin up high, just before you lift the dumb-bell each time, but hold your breath—that is, keep all the air in your lungs—until you finish lifting the dumb-bell, and it is clear up, right in front of, and close

to, your shoulder. For one can lift much better, or do any kind of hard work better, with the chest full of air. It is well to bear this in mind. Men who are used to lifting heavy weights take a deep, full breath, hold it all in their lungs, keeping the mouth shut, and then make their lift.

You can not only lift better, but you can jump better, swim better, row better, speak better, sing better, in short, make almost any effort better, if you fill your lungs with a deep breath just before you make each effort. *For you are really stronger when your chest is full than when it is not full.*

Questions.

1. Describe the First Biceps Exercise.
2. How should you stand during this exercise ?
3. How should the chin be held ?
4. How should you breathe ?
5. What do gymnasts call this exercise ?
6. How many times daily, the first week, should you curl the dumbbells in each hand ?
7. Why not more than ten times daily at first ?
8. How many times should you curl them each day the second week ?
9. And after that how many times a day ?
10. How do men used to lifting heavy weights breathe when they lift ?
11. What else can you do better with your lungs full than if they are partly full ?
12. Are you stronger when your chest is full or when it is not full ?

SECTION IX.

"A, B, C's" FOR THE ARMS.

Curling is a capital exercise for making the biceps muscles strong. For, as we all know, many boys and girls have not strong arms at all. Indeed, their arms are often so weak that they ought, almost, to be ashamed of them. Out of a class of forty boys or girls, you will often find that three quarters

of them have not strong enough arms to take hold of a bar, up as high as they can reach, and pull up until their chin touches the bar, as in Fig. 5, even once. But any boy or



Fig. 5.

girl, with arms at all strong, ought to be able to pull up thus from six to ten times without stopping; while any one with thoroughly strong arms can do it twelve or fifteen times, and even more. However, we will come to this harder work later on. What we want now, in practising these exercises, is to teach the arms their a, b, c's, *to get them ready for any good, vigorous work their owner may want to do with them by-and-by*, to make them strong and handsome as well as useful, and to add to the health and vigor of their owner.

Questions.

1. Have most school boys and girls strong arms?
2. Give an instance, showing that they have not.
3. What number of such pulls ought any boy or girl, with arms at all strong, to do without stopping?
4. How many such pulls can any one, with thoroughly strong arms, do?
5. What is the object of practising these exercises?
6. What other good results may we expect from these arm-exercises, besides making our arms useful?

SECTION X.

SECOND BICEPS EXERCISE, OR HAND CURLING.

Directions.—1. Stand erect, with the chin always turned upward.

2. Hold your right hand down at your side, not quite as low as you can, but bend your elbow a little.

3. Breathe slowly and deeply.

4. Place your left hand in your right hand, as in Fig. 6.

5. Bear down firmly with your left hand.

6. At the same time, lift strongly with your right hand, until it is up in front of your right shoulder.

7. Lower your right hand to your side, then bear down on it with your left hand, and lift up again as before.

8. Repeat this five times.

9. Rest a little.

10. Place your right hand in your left, in exactly the same way, and this time curl with your left hand five times, until you get it up in front of your left shoulder.

Now what have we been doing? Almost exactly the same thing as in the First Biceps Exercise.

There we curled a dumb-bell up to the shoulder, our biceps muscle doing most of the work. Here we curl another weight—heavier than the dumb-bell—up to the shoulder by exactly the same motion, and by using the same muscle.

You do not want to bear on with your



Fig. 6.

upper hand as hard as you can, simply because that makes the weight too heavy, and the work too hard at first, when your muscles are weak and soft, and not used to hard work.

Each day the first week bear down in this way, with your left hand on your right, five times without stopping. Bear down vigorously, but not as hard as you can.

Repeat this five times daily the first week. Each day the second week, bear down ten times with your left hand on your right, without stopping. Rest a little. Then bear down ten times with your right hand on your left without stopping. After the second week, bear down in this way fifteen times daily, on each hand.

This will not take long, only a minute or two daily on each hand. But it is grand for the biceps muscle, and can be done almost anywhere—in school or out, at home or when you are travelling, in doors or out. And the apparatus does not cost a single cent, for you always have it with you.

If you feel sleepy when you rise in the morning, try this exercise just for a minute, and see how it will brighten you up.

Questions.

1. Describe the Second Biceps Exercise, or Hand Curling.
2. Instead of a dumb-bell, what kind of a weight have we been curling this time ?
3. Should you bear on with your upper hand in this exercise as hard as you can ?
4. Why not ?
5. Are muscles which are not used to vigorous exercise strong ?
6. How are they ?
7. How many times daily the first week will it be enough to do this exercise ?
8. How many each day the second week with each hand ?
9. How many a day after that ?
10. How long each day will this take ?
11. Where can this exercise be practised ?
12. How much does the apparatus for it cost ?

SECTION XI.

THIRD BICEPS EXERCISE, OR DOUBLE CURLING.

In the First Biceps Exercise we had only one dumb-bell, using it first in one hand, and then in the other. Now try one dumb-bell in each hand.

- Directions.**—1. Stand erect.
2. Hold the chin up high.
3. Let your arms hang down straight.
4. Hold the chest out full.
5. Now slowly curl the bells until they are opposite your shoulders, as in Fig. 7.
6. Hold them there a moment.
7. Then gradually lower them till they hang down again.
8. Curl them in this way eight times without stopping.

Do this eight times each day the first week, twelve times daily the second week, and fifteen times each day thereafter right along.

Notice one thing in this exercise. Instead of bringing the dumb-bells up directly in front of your shoulders, turn the hands well outward at your sides as you begin, and so raise them until, when they are up



Fig. 7.

highest, they come opposite the side or corner of the shoulder, as in Fig. 7. The advantage of this is that, while it makes the biceps muscles full and strong, *it likewise helps to make the chest broad, and full, and sharply.*

Questions.

1. Describe the Third Biceps Exercise.
 2. Give another name for it.
 3. How should the chin be held ?
 4. How many times should you thus curl the dumb-bells each day the first week ?
 5. How many the second week ?
 6. How many a day thereafter ?
 7. How should the hands be held in this exercise ?
 8. Opposite what part of the shoulder should the dumb-bell be when it is up highest in this exercise ?
 9. Name some advantages of this exercise.
-

SECTION XII.

MAKING MUSCLES HARD.

It has been seen that the vigorous exercise not only makes a muscle strong, but also makes it harder than before.

Now, while boys like to have their muscles hard and strong, many girls may think they would not like to have hard muscles, but that those are only for boys and men.

Well, they may give over all fears on this point. And for this reason :

Exercise does take soft muscles and gradually make them firmer. But to make muscles really hard, instead of exercising them a few minutes a day, as proposed here, you have either to spend a long time each day, often hours, at it, or else do exceedingly hard work for a shorter time. See how a blacksmith swings his heavy sledge-hammer often eight, nine,

and ten hours a day. Feel his arm, and you find it almost as hard as a bone. So it is with the stone-mason and any one else who has to lift heavy weights with his hands all day long.

Let this blacksmith or any other strong man, through a wound, accident, or sickness, be kept on his bed for weeks, as was President Garfield. Try his arm, and you find it limp and weak, and softer even than your own. But when this same blacksmith gets out and back to his shop again, little by little, day by day, the returning health and the hard work render his muscles firmer and firmer, until he recalls to us him whom Longfellow so happily described when he wrote:

“Beneath a spreading chestnut-tree
The village smithy stands ;
The smith a mighty man is he,
With large and sinewy hands ;
And the muscles of his brawny arms
Are strong as iron bands.”

Questions.

1. Besides making a muscle strong, what else does vigorous exercise do for it ?
2. Why need girls not fear that exercises such as those described here will make their muscles too hard ?
3. To make muscles really hard, how long would you have to exercise each day ?
4. How many hours daily does the blacksmith often swing his sledge-hammer ?
5. How does his arm feel, soft or hard ?
6. Name another class of mechanics, besides blacksmiths, who have hard arms.
7. Confine a blacksmith to his bed for weeks, by accident or sickness, and what happens to his arms ?
8. And when he gets back at work again, what soon happens to his arms ?

SECTION XIII.

FIRM, NOT HARD, MUSCLES.

Now, some of this firmness of muscle every girl wants, every woman wants, either for vigorous health and useful strength in the ordinary matters of life, or, if she have no higher motive, then simply for pretty arms and figure. For, if she will look at a portrait or statue of any of the famous beauties of the past, or of the ideals of mythology, she will see that there was nothing weak or limp-looking about them, nor were they often very fleshy, but that they at once convey the idea of hale, erect, well-knit people, who scarcely knew what sickness meant. And she will notice the same thing in a thoroughly well-formed and shapely woman to-day. Were it possible, and should she try one of them at horseback riding, walking, skating, tennis, or other vigorous out-door exercise, she would very likely find that she would not only get tired before they did, but also that her face would look more weary than theirs. And for the excellent reason that such women as these would be really stronger and more enduring than she, and less liable to be sick.

The children of strong and robust people, and often their grandchildren as well, inherit their fine vigor, blooming health, and well-made body and limbs. "The women of beauty and genius," says Emerson, "are the children or grandchildren of farmers, and are spending the energies which their father's hardy, silent life accumulated in frosty furrows, in poverty, necessity, and darkness."

It will be seen, then, that we are not seeking the hardness of muscle which hard labor all day long brings, but only the firmness of muscle which comes from some vigorous exercise, taken for only a little while daily, but taken almost as regular-

ly and as surely as we take our meals. This will do much to insure good health and a vigorous, hearty body, which, when care and in-door life come in later years, will be very useful to us, will keep away many a sickness, and will help us to bear well whatever trying or unpleasant things may befall us.

Questions.

1. Why does every girl, and every woman, want some of this firmness of muscle ?
 2. Which will be likely to be the more easily tired by horseback riding, tennis, or other vigorous exercise, a girl whose muscles are soft, or one whose muscles are firm, and her frame well-knit ?
 3. Why ?
 4. What advantage have the children of strong and robust people ?
 5. What does Emerson say about such people ?
 6. What effect does vigorous daily exercise have besides making the muscles firm ?
 7. When will good health and a vigorous and hearty body prove very useful to us ?
-

SECTION XIV.

A HOME BAR.—FOURTH BICEPS EXERCISE, OR PULLING UP.

Before leaving the famous biceps muscle—the one so popular in the arm of a strong man, and so handsome in the arm of a comely woman—let us notice one other simple exercise, not for the school-room, but for home use, which will help make this muscle strong and well-shaped. It will need a small piece of apparatus that may be made thus :

From a hard-wood board an inch thick cut four pieces of the shape and size shown in Fig. 8. The carpenter calls these “cleats.” Screw two of them on the jambs of the door of your room at home, and up about as high as you can easily reach, and two more level with your shoulders.

Take an old pitchfork-handle, or buy a new one at the hard-



Fig. S.

ware store for a few cents. Cut it just long enough to fit easily into the two cleats, and make the ends square, so that it will not turn around in the cleats. Now you have a good horizontal bar, all ready for use.

Directions.—1. Stand under the bar.

2. Grasp it with both hands, as in Fig. 9.

3. Tip your head back, and hold it there.

4. Now try to pull up slowly till your chin touches the bar, as in Fig. 5, page 20.

Well, some of you can do it. But more can not. Never mind that. Now do this :

1. Catch hold of the bar as before.

2. This time give a little spring, and put your chin over the bar, as in Fig. 5.

3. Hold yourself so, long enough to take a good, full breath.

4. Now lower yourself just as slowly as you can, until your feet touch the floor.

5. Rest a minute.

6. Now jump up again, and place your chin on the bar ; then lower again very slowly.

Do this twice daily the first week. And four times daily the second week.

For this calls into action the same muscles as pulling up does, and is making them stronger all the time.



Fig. 9.

Questions.

1. Tell how a good horizontal bar can be fitted up cheaply at your home.

2. On what apparatus can you practise the Fourth Biceps Exercise ?

3. Describe this exercise.

4. Give another name for it.
 5. If you cannot lift your whole weight by your hands and arms until your chin touches the bar, what is a good exercise to try instead ?
 6. How long should you thus hold your chin on the bar before you begin to lower yourself towards the floor ?
 7. How fast should you thus lower ?
 8. How far down should you go ?
 9. How many times daily should this be done the first week ?
 10. How many each day the second week ?
 11. What muscles does this call into action ?
 12. With what effect ?
-

SECTION XV.

PULLING UP—CONTINUED.

Early in the third week, instead of springing up to the bar, try now to pull yourself up once from the floor until your chin touches the bar. Very likely you will find that now you can do it once. But, if not, then return to the springing up, and practise that five times each day through the third week.

By the fourth week you will be nearly sure to find that you can at last pull yourself up slowly once, till your chin touches the bar.

If so, then pull up once daily for a week. Twice daily the second week ; and as many at a time each day after that as you comfortably can. *This is great work for your biceps muscles.*

By-and-by, if you keep faithfully at it for only a minute or two a day, you need not be surprised if you can pull up in this way eight or ten times without stopping.

A really strong and athletic boy or man will sometimes pull up twenty or twenty-five times without great effort.

The writer once saw a class of twenty or more girls, from

eight to eighteen years of age, only one or two of whom could pull up in this way even once at first. Yet, by following exactly the plan described above, of practising springing up to the bar, holding the chin over it for a moment, and then slowly lowering the body till the feet were again on the floor, and repeating this only a few times each day, many of them became able, in six or eight weeks, to pull up slowly and fairly four or five times.

Many well-known exercises give the useful biceps plenty to do, such as

1. Hammering nails.
2. Chopping wood.
3. Shovelling.
4. Sawing wood.
5. Carrying a child, a loaded basket, or other weight on the arm.
6. Lifting a heavy weight high off the ground with one hand or both.
7. Going up a rope hand-over-hand.
8. Carrying a pail of water, hod of coal, a full valise, or other heavy weight in the hand.
9. Holding a dumb-bell, rifle, or other weight out at arm's-length.
10. Fencing.
11. Single stick.
12. Lawn-tennis.
13. Underhand or overhand bowling.
14. Arm-work on the trapeze.

Almost any of these, practised vigorously half an hour a day after a month of lighter work, will be found to make the biceps muscles large and strong.

Questions.

1. What should be tried early in the third week ?
2. If you cannot yet pull up fairly once, then how many times should you practise the Fourth Biceps Exercise each day after the second week ?

3. If, by the fourth week, you can pull up once, then how many times each day that week should you try thus to pull up ?
 4. How many daily the week after that ?
 5. How many daily after that ?
 6. What muscles of the arm is this exercise good for ?
 7. How many such pulls may you expect to be able by-and-by to do, if you practise this exercise faithfully ?
 8. How many such pulls are very strong boys and men sometimes able to do ?
 9. State what a class of girls accomplished, after six weeks of practising this exercise only a minute or two each day.
 10. Name many exercises all of which set the biceps at work.
 11. What sort of lifting calls the biceps into action ?
 12. What sort of carrying also ?
 13. What kind of work should be first practised before these are tried ?
-

REVIEW.

1. What does raising a weight in your right hand to your shoulder do to the front of your upper right arm ?
2. What do you call the muscle on this part of your arm ?
3. When you bend your arm at your elbow, what muscle do you use ?
4. When you lift a weight to your shoulder with either arm, what effect does it have on the back of the upper-arm ?
5. What on the biceps muscle ?
6. Which part of the arm, then, does this exercise develop ?
7. How should you breathe during the First Biceps Exercise ?
8. How do men used to lifting heavy weights breathe when they lift ?
9. What else can you do better with full lungs than when they are only partially full ?
10. When are you stronger, with them full or partly full ?
11. How many times daily, the first week, should you curl the dumb-bells in each hand ?
12. How many each day after the second week ?
13. Have most school boys and girls strong arms ?
14. Give a proof of this.
15. How many such pulls can any one with thoroughly strong arms do ?

16. Besides helping to make our arms useful, what other good results may we expect from these arm exercises ?

17. Describe Hand Curling.

18. After the second week, how many times should this exercise be practised with each hand ?

19. Where can it be practised ?

20. Describe Double Curling.

21. How should the hands be held in this exercise ?

22. Name some advantages of this exercise.

23. Besides making muscles strong, what else does vigorous exercise do for them ?

24. Why need girls not fear that these exercises will harden their muscles too much ?

25. To make muscles really hard, how long would they have to be exercised daily ?

26. When a blacksmith, or other strong man, is confined to his bed by sickness, what happens to his muscles ?

27. What happens to them when he gets back to his work again ?

28. Why does every girl and woman want some of this firmness of muscle ?

29. Which will tire the more easily at tennis, horseback riding, or other vigorous exercise, the girl whose muscles are soft, or the one whose muscles are firm, and her frame well-knit ?

30. What advantage have the children of strong and robust people ?

31. What does Emerson say about such people ?

32. Besides making muscles firm, name another effect of vigorous daily exercise.

33. When will good health, and vigorous, hearty bodies prove very useful to us ?

34. How can you fit up a good horizontal bar cheaply at home ?

35. Describe Pulling up.

36. If you are not strong enough at first to pull up, what is a good exercise to try beforehand ?

37. What muscles does this exercise call into action ?

38. How many such pulls are strong boys and men sometimes able to do ?

39. State what a class of girls accomplished in six weeks, after practising this exercise only a minute or two each day.

40. Name as many other exercises as you can which set the biceps muscle at work.

SECTION XVI.

THE BACK-ARM.

We have thus far been making our fore-arms strong. Also our biceps muscles, or the fronts of our upper-arms.

One part of the arm remains, namely, the back of the upper-arm. Let us call it *the back-arm*.

Here lie some of the muscles with which we push. Also some of those with which we pull, whenever we draw our elbow back past our side.

If the back-arm is not of good size, any arm, when the elbow is not bent, is almost sure to look slim, no matter how large the biceps muscle is.

For the biceps muscle only looks large when the elbow is bent ; but when it is straight, this muscle draws out long, and is seldom thick. On the other hand, good, full back-arms will never look slim, no matter how they are held.

Again, if the back-arm is small and the fore-arm large, as is often the case with painters, and men who use their fore-arms and wrists a great deal, the arm will look ungainly and badly proportioned, mainly because it is thus slim in the upper arm, where it should be of good size and full.

Any one, then, who wants to change a slim and weak-looking arm into a full and strong one, must, besides using his fore-arm and biceps, do plenty of back-arm work, and keep at it daily for months.

None of the exercises for the fore-arm, or for the biceps muscle, except some of those named on page 31, have given the back-arm much to do. So, then, let us set it at work.

Questions.

1. What is that part of the upper-arm which does not include the biceps called ?
2. What do we do with the muscles of the back-arm ?

3. If the back-arm is not of good size, how will the upper arm generally look, if the elbow is not bent, no matter how large the biceps may be?
 4. If the back-arm is of good size, will the whole arm ever look slim?
 5. How will a small back-arm and a large fore-arm cause the whole arm to look?
 6. Why?
 7. To change a slim and weak-looking arm to a full and strong one, what must its owner do?
-

SECTION XVII.

FIRST BACK-ARM EXERCISE.

Directions. — 1. Stand about two feet from the side of the room, facing the wall, each pupil being three or more feet from the next one.

2. Keep your heels together.

3. Turn your toes a little outward.

4. Put your hands against the wall as high as your shoulders, as in Fig. 10.

5. Turn your chin upward.

6. Breathe a deep, full breath, and hold the air in, by not letting it out through your mouth or nose.

7. Without taking your hands off the wall, bend your elbows, and fall slowly forward, till your chest touches the wall.

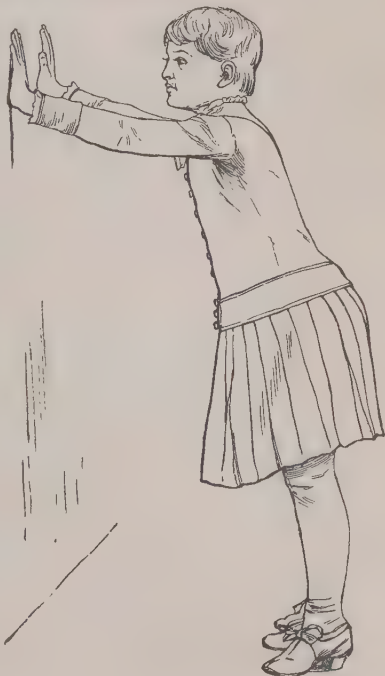


Fig. 10.

8. Keep your heels down firm on the floor all the time.
9. Hold the body and legs always straight and stiff.
10. Now push slowly back again, till your arms are straight, and you are nearly erect, as in Fig. 10.
11. Also let the breath out through your mouth or nostrils as you go back. Drop slowly forward again, taking care to breathe the deep breath, and to hold it in when you start, and to keep your chin up.
12. Touch your chest to the wall again, as before, facing the ceiling.
13. Repeat this exercise five times, without stopping.

That is enough for the first day. Should you keep on until you get so tired that you can push no more, you will find, on waking next morning, that some of your muscles are lame and aching from so much of this exercise, to which you are not accustomed. But you will also find that about the only part of your arm which aches will be this very back-arm, although it tells somewhat on the inner side of the fore-arm, where it comes nearest to the body. *This aching shows what part has been in action.*

But there is no need of keeping at it so long as to make you ache. It will be far better to start off with just a few times at first, and gradually increase the number as your back-arms get used to the work, and also get stronger, as they will every day, for it is the sensible use of muscles which makes them strong.

Push, then, against the wall, as in Fig. 10, only five times a day the first week. Each day the second week push in this way ten times, and each day after that twenty times.

Besides doing it these few times each day in school, if you will do it as many more at home—say, just as you get up in the morning, and again shortly before retiring at night—you

will find that your back-arms will soon become larger and better-shaped.

And pushing thus against the wall has been doing you another good, besides improving your back-arms, which we will look into presently.

In this exercise, though the back-arms have been active, the weight of the body has rested mainly on the feet and legs.

After practising these pushes against the wall till you can do fifty or more with ease, you will be ready for something a little harder.

Questions.

1. Describe the First Back-arm Exercise.
 2. How should the chin be held during this exercise ?
 3. How should the heels be kept ?
 4. How should the body and legs be held ?
 5. What is the right way to breathe during this exercise ?
 6. How many times daily should the movement be practised the first week ?
 7. If you do it too many times at first, what part of your arms will get lame and ache ?
 8. What does this aching show ?
 9. How many of these pushes should be taken each day the second week ?
 10. After that, how many daily right along ?
 11. If, besides this work in school, you do as much more each morning and evening at home, what effect will it have on your back-arms ?
 12. During this back-arm exercise, on what parts has the weight of the body chiefly rested ?
-

SECTION XVIII.

SECOND BACK-ARM EXERCISE.

- Directions.**—1. Place two chairs about two feet apart.
2. Stand about three feet from them, and place one hand on each chair.
3. Step back one or two steps, keeping your hands on the chairs.

4. Bend the elbows gradually, and lower yourself gently, till the face is down nearly level with the hands, as in Fig. 11.
5. Keep the head well up.
6. Hold the body and legs always stiff and straight.
7. Now push up until your elbows are straight again.
8. Repeat this five times.



Fig. 11.

At first it will not be easy for you to keep the body and legs straight, because some of the muscles which would help hold them so are not yet made strong. But by a little practice of this movement these muscles soon get more strength, and in a few weeks you can hold yourself as stiff in this way as any one.

The first week, then, bend down in this way only five times each day, without stopping. Each day the second week do this exercise eight times. And each day the third week, ten. And daily, right along after that, do as many as you can with comfort.

This exercise is much harder than it was to push against

the wall, as in the First Back-arm Exercise, for, as you see at a glance, and as you feel by trying it, this brings nearly half the weight on the hands and arms. And the parts of the arms which do most of the lifting, when you thus raise and lower nearly half of your body, are the back-arms.

When you get so that you can push in this way fifty times without difficulty, you will find that your back-arms are getting to be of pretty good size, and that they look better than they did a while ago ; indeed, that the whole arm seems larger and better shaped than before—as it really is.

Thus far we have been getting our back-arms strong, without any tools in our hands—nothing but a floor or the ground to stand on, a wall to push against, and two chairs or desks to rest on. We have also been pushing our hands out directly in front of us. But now let us remember one thing, that whenever we push any weight or anything else with our hands, whether in front of us, at our sides, or above our heads, not our biceps muscles, but our back-arms are at once busy, and do much of the work.

Let us, then, have one or two back-arm exercises with the dumb-bells.

Questions.

1. Describe the Second Back-arm Exercise.
2. How should the body be held during this exercise ?
3. Why is it not easy for some persons to keep the body and legs straight throughout this exercise ?
4. How is this weakness soon remedied ?
5. How many times daily the first week will it be enough to practise the Second Back-arm Exercise ?
6. Why not more times ?
7. How many times daily the second week ?
8. How many the third week ?
9. How many right along after that ?
10. Why is the Second Back-arm Exercise much harder than the First Back-arm Exercise ?

11. What parts do most of the lifting in this exercise?
12. When you can thus raise yourself fifty times without stopping, what effect may you expect on the size and looks of your arms?
13. Whenever we push with our hands in any direction, what part of the arm is at once set to work?

SECTION XIX.

THIRD BACK-ARM EXERCISE, OR PUTTING UP ONE DUMB-BELL.

- Directions.**—1. Take your dumb-bell in your *right* hand.
2. Stand erect, with left arm akimbo.
 3. Hold the chin up.



Fig. 12.

4. Breathe a full, deep breath, and hold it till you begin to lower the bell.

5. Now curl the bell. Of course this brings it in front of your shoulder, and works your right biceps muscle.

6. But now push the bell slowly and steadily straight upward, until it is as high up as you can reach, as in Fig. 12.

7. Hold it there till you count ten.

8. Now slowly let your breath out through your nose.

9. At the same time, lower the bell easily to your right shoulder. Hold it there a moment. Then push it slowly up again, breathing as before. Then lower it again. Do not bend the knees, or let the body lean over.

10. Repeat this six times.

Then lay the bell on the floor, and rest for about a minute. While thus waiting, do two things. First, keep your chin up

high ; second, breathe as slowly and deeply as you can. In this way you will find that you will get rested far quicker than you would if you stood or sat in some slouchy position, letting your chest sink in, and breathing rapidly.

Now take the dumb-bell in your *left* hand, curl it, then push it straight up over your left shoulder as high as you can. Hold the dumb-bell up there till you slowly count ten, let your breath out as before, and lower the dumb-bell slowly to your left shoulder. Repeat this six times. Then lay the dumb-bell on the floor, and rest as before.

That is enough of this exercise the first day, and each day the first week. The second week, do the same thing ten times a day with each hand, without stopping. After the second week, do it fifteen times a day with each hand.

This is a good, sensible exercise, and it also makes you strong in some other parts as well as in your back-arm, which we will consider later on.

Besides practising this exercise in school with the others, it is handy work to do at home for a minute or two at rising, and just before retiring.

Questions.

1. How should you put up a dumb-bell ?
2. Should you push the dumb-bell up slowly or quickly in this exercise ?
3. How should you breathe while practising this exercise ?
4. How many times should you practise it the first day with your right arm ?
5. How long, and in what way, should you rest after this, before doing the same with your left arm ?
6. How should you hold your body during this exercise ?
7. How long should the dumb-bell be held overhead before you lower it ?
8. How many times daily the first week should this be practised with each hand ?
9. How many the second week ?
10. How many times each day after that ?

SECTION XX.

FOURTH BACK-ARM EXERCISE, OR PUTTING UP BOTH DUMB-BELLS.

Directions.—1. This time take, not one dumb-bell only, but both of them, one in each hand.

2. Stand erect as before.

3. Hold the chin well up.

4. Breathe and hold a full, deep breath, until you begin to lower the dumb-bells.

5. Now curl them.

6. Next push them both straight upward together, as high as you can—the right one nearly over the right shoulder, the left one nearly over the left shoulder, as in Fig. 13.

7. Hold them up there till you count five.

8. Now lower them till they are level with your ears.

9. Keep the chin all the time held up high.

Each day the first week repeat this exercise five times without stopping. The second week do it eight times daily. After that do it ten times each day right along.

Now for the hardest back-arm work yet—work which the pupil should not attempt till the Fourth Back-arm Exercise can be done easily twenty times without resting.



Fig. 13.

Questions.

1. How should you put up two dumb-bells ?
 2. How does this differ from the Third Back-arm Exercise ?
 3. How high should you put the dumb-bells in this exercise ?
 4. How many times should it be practised each day the first week ?
 5. How many daily the second week ?
 6. How many each day after that ?
 7. How many times should you be able to practise the Fourth Back-arm Exercise without resting before you try the Fifth ?
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SECTION XXI.

FIFTH BACK - ARM EXERCISE, OR DIPPING.

Directions.—1. Stand in the aisle between two desks not over two feet apart. (It would be better for this exercise to have them only about sixteen inches apart.)

2. Place one hand on each desk, and stand erect.

3. Hold the chin up as high as you can.

4. Breathe a deep, full breath, and hold it, keeping the lips shut.

5. Now lift your feet off the floor, and lower yourself slowly, by bending your elbows, until your knees nearly touch the floor, as in Fig. 14.

6. Then push slowly up until your arms are straight again.

7. Keep your chin up high all the time.



Fig. 14.

Not one boy in five, not one girl in twenty-five, can do this once. Yet whoever cannot do it at least three times has rather weak back-arms.

But these are just the ones who need plenty of work for their back-arms, until they get them of good size and strong.

Remember that because a back-arm, or any other part of the arm, is large, is no sign that it is strong ; simply because the muscles may be both soft and fat, and *soft and fat people are seldom strong*. It is the quality, the firm, good fibre, as well as the size, that you want, in order to have strong, useful arms. And to have them well shaped, each part of them must be well developed, instead of only some parts.

Questions.

1. Describe the Fifth Back-arm Exercise, or Dipping.
2. How should you breathe during this exercise ?
3. Should you push slowly or quickly ?
4. How many times can most boys and girls do this exercise ?
5. What kind of back-arms has one who cannot do it at least three times ?
6. What do such boys and girls need ? If the back-arm, or any other part of the arm, is large, is it necessarily strong also ?
7. Why not ?
8. What else do you want besides size, to have strong, useful arms ?
9. What is necessary to have well-shaped ones also ?

SECTION XXII.

MORE ABOUT DIPPING.

This exercise we are at is called by gymnasts *dipping*—a good name to remember it by; for, of course, in doing it, you dip your body down between your arms. The reason it is

harder than any of the previous back-arm exercises is plain. In each of the others your back-arms and hands either had to hold up only a part of the weight of your body, or else a pair of small dumb-bells. But, in dipping, your back-arms and hands have to hold up almost the whole weight of your body. Other muscles help, as will be seen shortly, but the back-arms do a large share of the work.

Dipping is one of the best exercises known for making the back-arms strong and handsome. Most men who think themselves strong, and really are so, but only in certain muscles, have not strong back-arms. They cannot do even a dozen dips. The writer, in 1879, saw Hanlan, the famous oarsman, try to do a few dips. Although very powerful in the muscles he rowed with, yet when at first he dipped down till his knees touched the floor, he actually could not raise up *once*. A few months after we saw him try again. He dipped fairly twice. At the third dip he got down till his elbows were bent, but could scarcely straighten up again at all, and stopped. And yet this same Hanlan is one of the greatest rowers the world ever produced—indeed, was long the champion oarsman of the world. And in the muscles most used in rowing—those of the loins, the broad of the back, the abdominal muscles, and those of the fore-arms, the front of the thighs, and of the calves—he is a very strong man. But he simply has not strong back-arms, nor do they look either large or strong. In fact, his upper-arm doubled up, that is, with the fist drawn up in front of the shoulder, measured only thirteen inches in girth, while a thoroughly well-built, strong man as tall as he—about five feet eight inches—ought to measure over fourteen inches around the upper-arm when it is doubled up, and should be able to do with ease quite a number of dips—at least twenty. Now and then you will see some strong, active boy or man who can do twenty-five or thirty dips.

Questions.

1. What is the Fifth Back-arm Exercise called by gymnasts ?
 2. Why is it so called ?
 3. Why is it harder than any of the other four back-arm exercises ?
 4. Do other muscles besides those of your back-arms help bear your weight in dipping ?
 5. How does dipping affect the back-arms ?
 6. Do most men who are strong have strong back-arms ?
 7. Can such men do many dips ?
 8. Name a famous oarsman who is an example of this.
 9. How many dips could he do at first ?
 10. How many a few months later ?
 11. In what muscles is he strong ?
 12. What kind of back-arms has he ?
 13. What does he measure about the upper-arm when it is doubled up ?
 14. What should a strong man of his height measure ?
 15. How many dips ought such a man to be able to do ?
-

SECTION XXIII.

DIPPING—CONCLUDED.

A gentleman in New York, with whom we are acquainted—a middle-aged man, five feet ten inches in height, and weighing at least a hundred and ninety pounds—has dipped not merely twenty-five or thirty times, but *eighty-four times*, without stopping—an extremely hard piece of work. And he has simply magnificent back-arms (as will be seen in the picture of him, Fig. 15), being sixteen inches in girth, or three more than Hanlan's—arms which look well either in rowing or exercising costume, that is, with nothing on them, or which set off a well-cut coat to great advantage.

And, by the way, which will look better in any man or woman, boy or girl, who wears a garment with snugly fitting sleeves—well-built, shapely arms, or half-built, spindling ones ?



Fig. 15.

No one who can do a large number of dips, say fifty or more, can fail to have strong and good-sized back-arms. And for the reason that it takes very strong and fine back-arms to lift the body in this way so many times.

We have seen, page 43, how to dip. Now let us do a little of this work. Dip slowly and fairly once each day the first week; twice each day the second week; after that, five times daily without stopping. But if you find this number still too great, then dip as many times as you can.

Of course, if there are parallel bars in the school-room, they will be handier for dipping than the desks. Indeed, that is one of their chief uses.

It will be a good plan to get the carpenter to make you (or else make them yourself) a pair of little bars for home use, as in Fig. 8, page 28. The foot-note will tell him just how to make them to suit you.*

Now, on these handy bars at home, you can try a few dips at rising, and again just before retiring, thus adding to the good you have done your back-arms in the school exercise, and doing much to increase their size and strength.

Questions.

1. State how many dips one gentleman was able to do.
2. What sort of back-arms has he ?
3. Which look better in any one who wears a snugly fitting garment, well-built and shapely arms, or half built ones ?
4. What kind of back arms will one have who can do fifty or more dips ?
5. Why so ?
6. What exceptions are there to this ?
7. How many times a day the first week should you dip ?
8. How many times daily the second week ?
9. How many daily after that ?
10. What are better than desks on which to practise dipping ?
11. Tell how to make a simple pair of these bars for home use.
12. When can these bars be conveniently used ?
13. With what result ?

* Bore into each jamb of the bedroom door, about the height of the waist, a hole as large as the bar is thick. Now work the auger farther into each hole, till you get it an inch or more into the first piece of studding. Cut a pitchfork-handle in halves, pass one half through the hole in one jamb, and into its nearest studding-piece. Pass the other half through the other hole, and into its studding-piece. Cut enough off each piece of the handle to leave the distance between the two about seventeen inches. Now you have a pair of bars on which you can try one of the exercises usually practised on the parallel bars—namely, dipping—and that one worth almost as much as all the rest.

SECTION XXIV.

VARIETY OF BACK-ARM EXERCISES.

We have thus given a few exercises for the back-arms. They are quite enough, though, if practised even two minutes daily, to tell very favorably on the size and shape of the back-arms long before a year is out.

There are many other exercises that every boy or girl would do well to know, and which, if practised a little daily, and patiently, will help develop fine back-arms. Such are

1. Standing with your back to the chest-weights in the gymnasium, and pushing the handles outward.
2. Pushing them upward.
3. Boxing.
4. Striking a sawdust-bag, as boxers do.
5. Pushing a barrel or other heavy article forward, as into a wagon.
6. Pushing up from the floor until the arms are straight, as in Fig. 16, page 50, and then bending the elbow and slowly lowering the face till it is near the floor, keeping the body and legs stiff. This is a grand home exercise.
7. If you want to make this a little more exciting, try to clap your hands just as your elbows are straight, and before you begin to dip. It is well to do this with care, otherwise an India-rubber nose may prove useful.
8. Going through the parallel bars with your arms straight, either forward or backward, or with your arms bent; indeed, in almost any way at all, for one of the chief uses of parallel bars is to strengthen and develop the back-arms.
9. Turning hand-springs.
10. Or cart-wheels.
11. "Putting the shot."
12. Standing erect, falling face forward to the floor, but really catching yourself on your hands, the body being all the time held rigidly straight.
13. Sawing wood.
14. Mowing with a lawn-mower.

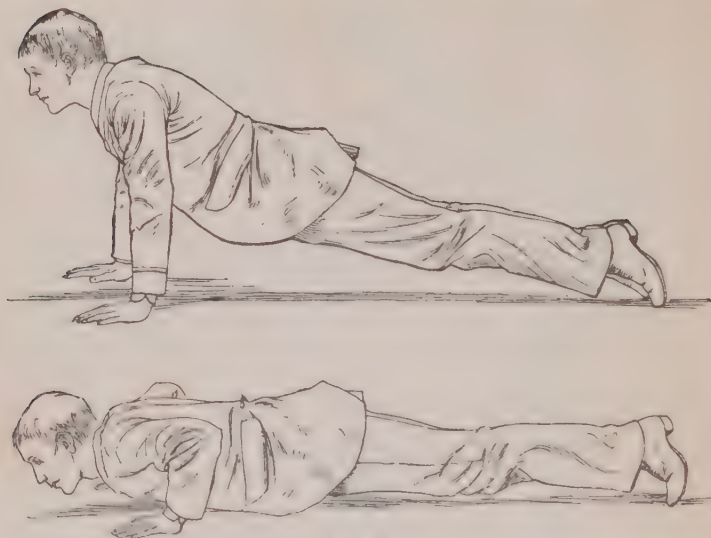


Fig. 16.

15. Sword exercise.
16. Walking on your hands.
17. Pushing a dumb-bell or any other weight up over your head until your arms are straight, or nearly so.
18. Anything, in short, with which you push vigorously, with one hand or both, in front of you, over your head, or at your side, and either with or without a weight in your hand.

Questions.

1. What will be the effect of the few back-arm exercises already given, if they are practised even two minutes daily?
2. Are there other back-arm exercises?
3. How should they be practised?
4. Name as many other back-arm exercises as you can.
5. How do you do the exercise shown in Fig. 16?
6. Name one of the chief uses of parallel bars.
7. What kind of pushing calls the back-arm into action?

SECTION XXV.

FIRST INNER BACK-ARM EXERCISE.

Before leaving the back-arm, we will have one or two exercises for the inner side of it, because this part is not brought much into play in the above back-arm work.

Directions.—1. Stand beside your desk.

2. Hold the chin up high.

3. Place your right hand on the forward corner of the desk next you.

4. Press hard against the desk with your hand, as though trying to pull the desk backward.

5. As you pull, put your left hand on that part of your upper-arm next to your body, as in Fig. 17.

Before you begin to pull, this part of your upper-arm will feel soft ; but the moment you pull, it hardens at once, and feels firmer the harder you pull.

So we have one exercise that sets the inner side of the back-arm at work, and that not a pushing exercise, but a pulling one ; for whenever you reach your hand out in front of you, and bear downward—either lightly, as in playing a piano, or heavily, as in striking a downward blow—or draw your elbow back past your side, as in rowing, or in driving a horse, you at once set this part of the arm at work. You also use important muscles on your back and shoulders, as we shall see further on.



Fig. 17.

Questions.

1. What part of the back-arm needs other work than pushing, in order to make it strong and of good size?
2. Describe a simple exercise for the inner side of the back-arm.
3. What part of your back-arm is brought into action when you reach your hand out in front of you and bend down forward, as in piano-playing?
4. Name other kinds of work for this part of the arm.
5. What other muscles do these exercises set at work?

SECTION XXVI.

SECOND INNER BACK-ARM EXERCISE.



Fig. 18.

Directions. — 1. Stand erect, with a dumb-bell in each hand, letting them hang down at your sides.

2. Breathe a full, deep breath, and hold it in, keeping the lips shut.

3. Now slowly raise the dumb-bells up behind you, until your arms point out backward, as in Fig. 18.

4. Do not bend your elbows at all.

5. Keep the finger-nails upward, and the backs of the hands downward.

6. Hold the dumb-bells up back of you in this way till you count five, holding your breath in all the time.

7. Now gradually lower them to your sides again, at the same time slowly letting out your breath.

8. Do it again just as before, breathing in the same way, and taking care, when you get the dumb-bells up high behind you, to hold them there until you slowly count five.

Repeat this five times each day the first week, eight times daily the second week, and twelve each day after that.

This also is an excellent exercise to try at home for a few strokes each morning and evening. It can be varied by leaning forward, as in Fig. 19.

This inner part of the upper-arm is not only vigorously used in rowing, but it is the only part of the upper-arm which rowing takes much hold of at all, leaving the biceps almost idle, and doing but little for the main part of the back-arm. Hence, you will often see famous oarsmen with poor and slim upper-arms, even two or three inches smaller than they ought to be.

Thus we have taken the four parts of the arm,

a, the fore-arm,

b, the biceps muscle,

c, the back-arm,

d, the inner side of the back-arm ;

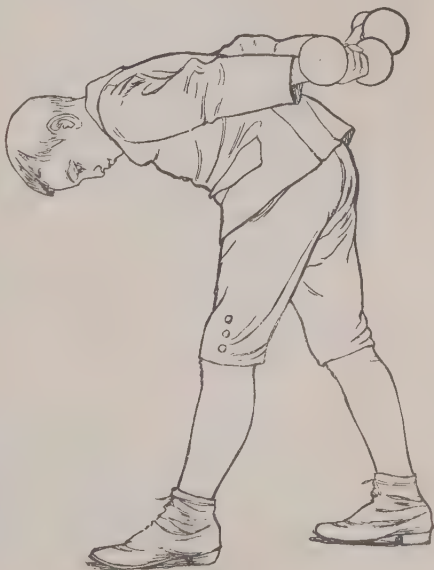


Fig. 19.

and we have singled out a few exercises for each part, many of them with no apparatus at all, easy to learn, and taking but a little time each day. Yet, practise them that little time each day—vigorously, of course; for it does not pay to exercise in any other way—and before the end of a year you will find that your arm is quite a different arm, and a different-looking arm, and a much better-looking arm than it was when you began.

Questions.

1. Describe the Second Inner Back-arm Exercise.
 2. How should you breathe during this exercise?
 3. How should the elbows be held?
 4. How long should the dumb-bells be held up behind you?
 5. How many times should this be done each day the first week?
 6. How many daily the second week?
 7. How many right along after that?
 8. How can this exercise be varied?
 9. How much of the upper-arm does rowing call into play?
 10. What kind of upper-arms do even famous oarsmen often have?
 11. Name the parts of the arm.
 12. State what has been singled out thus far for each part.
 13. How long will these exercises require each day?
 14. How should they be practised?
 15. What will you find before the end of a year?
-

REVIEW.

1. What part of the arm do we call the back-arm?
2. What do we do with the muscles of the back-arm?
3. If they are small, how does the arm look?
4. If they are of good size, will the back-arm ever look slim?
5. How will a small back-arm and large fore-arm make the whole arm look?
6. What must be done to change a slim and weak-looking arm into a full and strong one?
7. Describe the First Back-arm Exercise.

8. On what parts does the weight rest during this exercise ?
9. Describe the Second Back-arm Exercise.
10. Why is it much harder than the First Back-arm Exercise ?
11. What parts do most of the lifting during this exercise ?
12. When you push with your hands in any direction, what part of the arms is at once set at work ?
13. How do you do the Third Back-arm Exercise ?
14. How does the Fourth Back-arm Exercise differ from the Third ?
15. How high should you push the dumb-bells during this exercise ?
16. Before trying the Fifth Back-arm Exercise, how many times should you be able to do the Fourth without resting ?
17. Explain Dipping.
18. How many times can most boys and girls do this exercise ?
19. Should you push slowly or quickly ?
20. What kind of back-arms has any boy or girl who cannot dip at least three times ?
21. What do such boys and girls need ?
22. If any part of the arm is large, is it necessarily strong also ?
23. What else do you want besides size to have strong, useful arms ?
24. What is necessary to have well-shaped ones also ?
25. Why is dipping harder than any of the other back-arm exercises ?
26. Can men strong in other parts, but not in their back-arms, do many dips ?
27. Name a famous oarsman who is an example of this ?
28. In which muscles was he strong ?
29. What kind of back-arms had he ?
30. What does he measure about the upper-arm when it is doubled up ?
31. What should a strong man measure ?
32. How many dips ought such a man to be able to do ?
33. What kind of back-arms will one have who can do fifty or more dips ?
34. Why so ?
35. What are better than desks on which to practise dipping ?
36. Name as many other back-arm exercises as you can.
37. Describe a simple exercise for the inner side of the back-arm.
38. Name other kinds of work for this part of the arm.
39. Describe the Second Inner Back-arm Exercise.
40. What kind of upper-arms do even famous oarsmen often have ?

PART III.—THE SHOULDER.

SECTION I.

FIRST FRONT-SHOULDER EXERCISE.

THE arms, as we know, are not separated from the body, but are attached to it; and there is little work any part of them can do which does not, at the same time, set some parts of the body at work.

We will begin with the front of the shoulder, a part where few school boys or girls are nearly as full, well-shaped, and strong as they should be. Indeed, if you look at a class of forty or fifty boys in a school-room (unless it is at West Point), you will see at once, not only that most of them tend to sink in a little just at the front of each shoulder, but that their coats have wrinkles in them in this part, the boys have held their shoulders forward so much.

Let the same boys practise a few exercises which take hold of them at the front of each shoulder, and also tend to draw their shoulders well back, which the very filling-up of these muscles helps much to do, and you will see that, long before the end of a year, these wrinkles are nearly or entirely smoothed out, and that their coats fit them better at the front of the shoulders, and look better there, than they did before. And in this respect the same thing is as true of girls as of boys.

Let us, then, try a few exercises for the front of each shoulder.

Directions.—1. Stand with a dumb-bell in each hand.
 2. Keep the chin up.
 3. Hold the dumb-bells out in front of you, about as high as your waist, as in Fig. 20.
 4. Keep your elbows straight and parallel.
 5. Take a full, deep breath, and hold it.

6. Now lift the dumb-bells slowly upward, out in front of you, till they are as high as your shoulders, as in Fig. 21, page 58.

7. Hold them there till you count five, not bending your elbows.

8. Now slowly lower them, at the same time gradually letting out your breath.

9. Lift them up again exactly as before, and lower again. Do it in all four times without stopping.

Do it four times each day the first week, seven times daily the second week, and ten times each day after that right along.

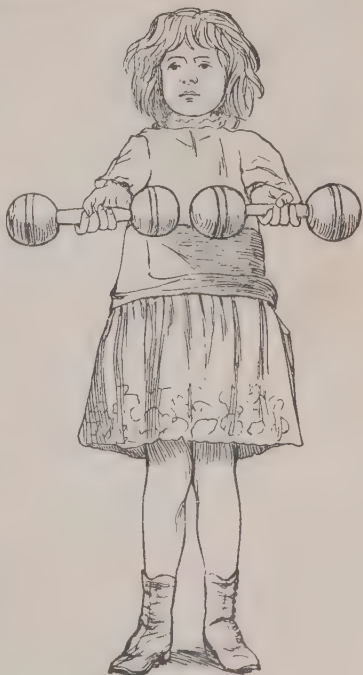


Fig. 20.

Questions.

1. Generally, if you set any part of the arm at work, what effect will it have on some part of the body?
2. Are most boys and girls well-shaped and full at the front of each shoulder?
3. In these parts of the body, what do most of them tend to do?

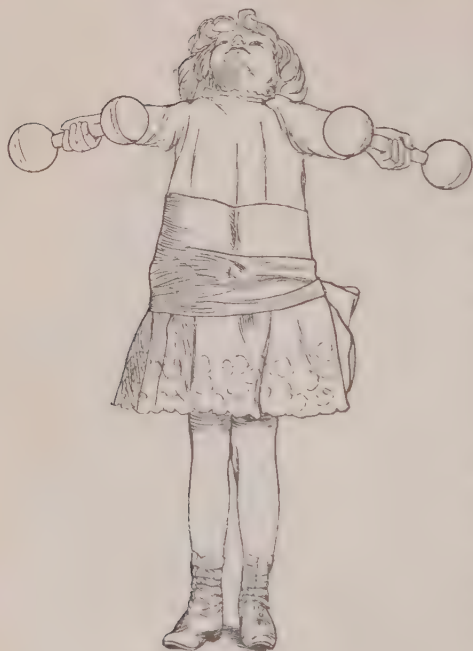


Fig. 21.

4. What kind of exercise will help take these wrinkles out of the coat?

5. What other effect will these exercises have on the coat besides helping to take these wrinkles out of it?

6. Describe the First Front - Shoulder Exercise.

7. How should you hold the dumb - bells during this exercise?

8. How the arms?

9. How long should you hold the dumb-bells out in front of you in this exercise?

10. How should you breathe, also?

11. How many times daily are enough the first week?

12. How many the second week?

13. How many daily after that?

SECTION II.

SECOND FRONT-SHOULDER EXERCISE.

Directions.—1. Take a dumb-bell in each hand.

2. Hold them straight out in front of you, about as high as your mouth, as in Fig. 22.

3. Keep the elbows straight.

4. Keep the arms parallel.

5. Hold the chin up above the level.

6. Now walk slowly up the aisle, then down the next aisle, and back to where you started, keeping the dumb-bells out in front of you all the way, as just described.

Carry them in this way over the same distance once each day the first week; twice each day the second week; after that three times each day right along.

Questions.

1. Describe the Second Front-Shoulder Exercise.
2. How should the chin be held in this exercise?
3. How high should you hold the dumb-bells?
4. How far should you walk with the dumb-bells thus out in front of you each day the first week?
5. How far daily the second week?
6. How far each day after that right along?



Fig. 22.

SECTION III.

THIRD FRONT-SHOULDER EXERCISE.

- Directions.**—1. Take a dumb-bell in each hand.
2. Stand with the left foot forward about eight inches.
 3. Hold the dumb-bells up in front of your shoulders.
 4. Hold your chin up high, and breathe your chest entirely full.
 5. Now strike swiftly out in front of you with your left hand, as in Fig. 23.

6. Draw your left hand back till it is near your left shoulder again.



Fig. 23.

7. Next strike out in the same way with your right hand.

8. Then draw it near your right shoulder again.

9. Now strike out again with your right hand, and then with your left, until you have struck out five times with each hand.

Strike in this way five times daily the first week, eight times each day the second week, and ten times daily after that.

Questions.

1. Describe the Third Front-Shoulder Exercise.
2. Where should you place the left foot during this exercise?
3. How should you breathe during it?
4. How should you strike out in this exercise?
5. How many such strokes should you make daily the first week?
6. How many each day the second week?
7. How many each day after that right along?

SECTION IV.

A VARIETY OF FRONT-SHOULDER WORK.

You may bring this muscle at the front of the shoulder into active use in a large variety of ways, many of them common in daily life.

Whenever you put your hand up to your head, as to brush your hair, put on your hat or collar, or to put food into your mouth, at once the front of your shoulder is at work. Not

vigorously, to be sure, because the weight of the brush, fork, or other article is but trifling, and does not call for much muscular exertion. But if it weighed, say twenty pounds, you would soon find, from the way this front of the shoulder would quickly tire, that you were giving it hard and unusual work to do.

1. The wood-chopper plies it lustily.

2. The fencer more yet—that is, on his sword-arm ; for he not only reaches his sword-hand far out in front of him, and keeps it darting back and forth, but he sometimes keeps up this vigorous exercise for a long time without resting—the work, of course, telling very decidedly on such of his muscles as are at work.

3. The boxer still more.

4. The batsman uses it somewhat.

5. The blacksmith and mason more yet.

6. The mower with a scythe a good deal.

7. Also the reaper.

8. Lawn-tennis gives it some work.

9. Croquet very little.

10. Carrying dumb-bells or other weights out in front of you, either with arms straight or bent.

Anything, in short, which gets your hands much up in front of you, or which keeps them there, especially with something heavy in them, will help you in this good work of building a front of the shoulder, strong, full, useful, and shapely.

Questions.

1. Are these front parts of the muscles of the shoulders brought into use in many ways in common daily life ?

2. Mention some of these ways.

3. Does the fencer use the front of one of his shoulders, or of both ? Of which one ?

4. Which game calls the front of the shoulder the more into play—lawn-tennis or croquet ?

SECTION V.

FIRST SIDE-SHOULDER EXERCISE.

Now let us look at an even more useful part of the shoulder (though of the same muscle)—the side or corner of it.

You cannot put your hand up over your head without putting this part of your shoulder at work. And if for a little while, unless you are used to it, you put your hands, with no weight in them, high up over your head, you will find you are getting tired and aching here (in the side of the shoulder), sure proof that you are working it unusually hard.

Let us try one or two side-shoulder exercises, such as can be practised readily in the school-room.

Directions.—1. Stand erect.

2. Hold the chin up high.

3. Breathe a full, deep breath.

4. Let the air pass out slowly through your nostrils.

5. Now take two more such breaths.

6. Shut your fists.

7. Now strike sharply with your right fist straight up over your right shoulder.

8. Bring it quickly down, till level with your shoulder.

9. Then strike upward in the same way with your left fist over your left shoulder.

10. Keep on in this way, first with your right hand, then with your left, till you have struck upward five times with each hand.

Strike thus five times with each hand daily the first week, ten times daily the second week, and twelve times each day after that.

Now you are at steady exercise for your shoulders, that

will make them stronger, little by little, before a year has gone, just as you are sure to be further on at the end of the year than you were at the beginning in arithmetic, geography, geometry, or whatever else you are studying.

Questions.

1. What part of the shoulder does putting your hand up over your head take ?
 2. Describe the First Side-shoulder Exercise.
 3. How should you breathe during this exercise ?
 4. How should you strike in this exercise ?
 5. How many times should you so strike with each fist daily the first week ?
 6. How many each day the second week ?
 7. And how many a day after that ?
 8. What will be the effect of this steady exercise for your shoulders before you have thus practised it daily even for one year ?
-

SECTION VI.

SECOND SIDE-SHOULDER EXERCISE.

Directions.—1. Stand erect.

2. Keep the chin up very high.

3. Breathe three slow, very full breaths.

4. Instead of pushing up the dumb-bell first with one hand and then with the other, raise both at the same time, as high as you can.

Why, this is the Fourth Back-arm Exercise. Certainly. For you have learned that when you use any muscles of your back-arm, you also at once set some other parts at work. Well, now we are beginning to find how true this is.

For the rest, then, of the Second Side-shoulder Exercise, simply repeat the Fourth Back-arm Exercise, as described on page 42.

These exercises stretch and enlarge your lungs, send the blood more vigorously through your veins, and, for the time, make you stronger.

Questions.

1. Describe the Second Side-shoulder Exercise.
 2. How should you breathe during this exercise ?
 3. Name some effects of this slow, deep breathing.
-

SECTION VII.

THIRD SIDE-SHOULDER EXERCISE.

Directions.—1. Hold the dumb-bells up high over your head—one in each hand—and look at the ceiling directly above you.

2. Slowly breathe in a large, deep breath, and hold it in, keeping the lips shut.

3. Now slowly lower the dumb-bells out sideways, until your arms are out straight at your sides and level with your shoulders, as in Fig. 24.

4. Hold them there till you slowly count five.

5. Now lift them slowly upward in just the track they came down, never once bending your elbows.

6. Hold them over your head a moment.

7. Now breathe out through the nose—not through the mouth.

8. Repeat this five times without stopping, keeping the chin up as high as you can all the time.

This is enough for the first day, and each day the first week. The second week, do it seven times each day. After that ten times each day in school, and as many more every morning and evening at home. *For a little smart work with any muscles, even for only one minute, mornings and evenings, helps*



Fig. 24.

out the school-exercises greatly, and, in a few months, you will see what a difference it will make in the size and strength of the muscles so used. If any one wants to get ahead even faster yet, a few minutes each afternoon may be spent at this work.

As will be seen later, there is scarcely any better chest-expander than this exercise.

Questions.

1. Describe the Third Side-shoulder Exercise.
2. How should you hold the dumb-bells during this exercise ?
3. At what should you look ?

4. How should you breathe ?
 5. Should you lower your hands quickly or slowly ?
 6. How many should you count while your arms are out straight at your sides, and before you raise them again ?
 7. How should you hold the chin in this exercise ?
 8. How many times daily should you thus lower and raise the dumb-bells in school during the first week ?
 9. How many times each day the second week ?
 10. How many a day after that in school ? .
 11. How many daily out of school ?
 12. What is the advantage of even a little work out of school ?
-

SECTION VIII.

FOURTH SIDE-SHOULDER EXERCISE.

Directions.—1. Hold the dumb-bells out at arm's-length at your sides, as in Fig. 24, page 65.

2. Do not bend your elbows.

3. Now walk slowly up the aisle, turn down the next aisle, and return to the place whence you started, being sure to keep the chin all the time turned up high.

4. Breathe as slowly and deeply as you can all the time you are walking.

Hold the dumb-bells in this way, and walk this same track once a day the first week. Walk it in the same way twice each day the second week, without stopping ; and daily, after that, three times, without stopping.

Questions.

1. Describe the Fourth Side-shoulder Exercise.
2. How should the elbows be held during this exercise ?
3. How far should you thus walk each day the first week ?
4. How far daily the second week ?
5. How far after that right along ?

SECTION IX.

FIFTH SIDE-SHOULDER EXERCISE.

Directions.—1. Hold a dumb-bell in each hand, as high overhead as you can.

2. Keep the chin up all the time, and the elbows always straight.

3. Breathing slow, full breaths, walk slowly up the aisle, down the next aisle, and back to the place from which you started.

Walk the same distance in this way daily the first week, clear around the room daily the second week, and around it twice each day after that right along.

You will now begin to find that you have muscles on the sides or corners of your shoulders, if you never discovered it before.

Questions.

1. Describe the Fifth Side-shoulder Exercise.
 2. How high should the dumb-bells be held in this exercise ?
 3. Should you walk slowly or rapidly ?
 4. How far daily each week in this way ?
 5. What fact about your shoulders will this exercise show you ?
-

REVIEW.

1. If you use a part of the arm, what effect does it generally have on the body also ?

2. Are most boys and girls well-shaped and full at the front of each shoulder ?

3. What kind of exercise will remove these wrinkles ?

4. Describe the First Front-shoulder Exercise.

5. Describe the Second Front-shoulder Exercise.

6. How far should you walk with the dumb-bells thus held out in front of you each day after the second week ?

7. Describe the Third Front-shoulder Exercise.
 8. How should you strike out in this case ?
 9. Mention some ways in common life in which the front muscles of the shoulders are brought into use.
 10. Does the fencer use the front of one of his shoulders, or both ?
 11. Describe the First Side-shoulder Exercise.
 12. How should you strike during this exercise ?
 13. What effect will this steady exercise for your shoulders have before you have been at it daily even for one year ?
 14. How do you breathe during the Second Side-shoulder Exercise ?
 15. Name some effects of this kind of breathing.
 16. Describe the Third Side-shoulder Exercise.
 17. How many times daily would it be well to practise this exercise at home ?
 18. What is the advantage of even a little work out of school ?
 19. How should the elbows be held during the Fourth Side-shoulder Exercise ?
 20. Describe the Fifth Side-shoulder Exercise.
 21. What fact will the Fifth Side-shoulder Exercise show you ?
-

TO TEACHERS.—A simple way to make the pupils sit erect is to have them, *all the time they are in school*, first sit far back on the chair, and, secondly, hold up their chins. It would be well to have hanging on the wall of each school-room, as mottoes, a card reading thus :

“ Sit far back on the chair.

Hold up the chin.

Breathe as deeply as you can.”

PART IV.—THE UPPER-BACK.

SECTION I.

FIRST UPPER-BACK EXERCISE.

ONE part of the shoulders remains—the back of them.

You cannot put your hands behind you without using the muscles on the back of your shoulders; and if you do a great deal of work which makes you draw your hand or elbow either quickly or strongly backward, you will soon make the backs of your shoulders strong, and very likely well-shaped also. Indeed, you will strengthen nearly the whole of your back above the waist, and make it shapely as well; for a well-built and well-developed back is one of the shapeliest parts of the human body. Whoever has a narrow back will always seem to lack power—indeed, will often look weak. This upper half of the back is known as *the broad of the back*.

Directions.—1. Stand erect, with the chin up high, a dumb-bell in each hand, and your arms straight out in front of you as high as your shoulders.

2. Draw one elbow smartly backward, as in Fig. 23, page 60, and hold it there.

3. Now do the same with your other elbow.

4. Repeat this exercise ten times with each elbow.

Do it ten times daily the first week, fifteen times a day during the second week, and twenty times daily after that right along.

Not only the backs of your shoulders, but the muscles of the middle of the back, between the shoulders, are now hard at work.

Questions.

1. If you put your hands behind you, on what part of your shoulders does it set the muscles at work ?
 2. How can you make the backs of your shoulders well-shaped and strong ?
 3. What other parts of your body will this exercise strengthen ?
 4. What effect also will this exercise have on the shape of the upper half of the back ?
 5. What is a narrow back likely to lack ?
 6. How will it generally look ?
 7. What is the upper half of the back called ?
 8. Describe carefully the First Upper-back Exercise.
 9. Do you need any apparatus for this exercise ?
 10. How many times daily during the first week should you thus draw the elbows backward ?
 11. Should the exercise be an active or a sluggish one ?
 12. How many times each day should you practise this exercise during the second week ?
 13. How many daily after that right along ?
-

SECTION II.

SECOND UPPER-BACK EXERCISE.

Directions.—1. With a dumb-bell in each hand, and breathing slowly and very deeply, raise both hands behind you, as in Fig. 25.

2. Breathe as deeply as you can, and hold your breath in all the time the dumb-bells are up.

3. Keep the elbows straight, hold the head back, and be sure to keep the backs of your hands turned upward all the time you are thus raising the dumb-bells back of you.

4. Repeat this six times.

Raise the dumb-bells in this way six times daily the first week, ten times each day the second week, and as many times daily after that as you can with ease.

This is fine work for the back of the shoulder and the whole upper-back; for holding your head back thus stiffly sets at work the back of the neck and the middle of the upper-back, and raising the dumb-bells behind you sets at work the back of your shoulders and all across the back just under your arms—indeed, about the whole of the upper-back.

If you would like to find its effect on the muscles there, just take both dumb-bells in your right hand. Place your left hand on the back of your right shoulder, and on that part of your back nearest your right back-arm. Now, with your right hand, raise the dumb-bells as high behind your back

as you can, keeping your right elbow always straight, and just feel how these muscles on your right shoulder and on the right side of your back, just behind your right arm, swell and harden.

This shows in a moment that what you are doing has suddenly set these muscles of the right half of the upper-back vigorously at work.



Fig. 25.

Questions.

1. Describe the Second Upper-back Exercise.
 2. How should the elbows be held in this exercise ?
 3. How should the backs of the hands be held ?
 4. How should the head and neck be held in this exercise ?
 5. How many times should this exercise be practised the first week ?
 6. How many times daily the second week ?
 7. How many times after that right along ?
 8. What part of the neck does this exercise set at work ?
 9. What three parts of the back ?
 10. How can you find its effect on these parts ?
 11. How does this exercise differ from the Second Inner Back-arm Exercise ? (See page 52.)
-

SECTION III.

THIRD UPPER-BACK EXERCISE.

Directions.—1. Hold the dumb-bells straight out in front of you.

2. Breathe slowly, and very deep, full breaths.

3. Now swing the dumb-bells slowly around behind you, as far as you can, keeping them all the time about as high as your shoulders, as in Fig. 26.

4. Do not bend your elbows at all.

5. Hold the dumb-bells for a moment as far behind you as you can.

6. Now swing them around in front of you again, not bending your elbows.

7. Swing them back as before.

8. Repeat this six times.

Do this six times daily the first week, ten times daily the second week, and fifteen times each day after that right along.

This exercise develops not the back of the shoulder only, but the whole shoulder.



Fig. 26.

These last three movements make good school-room exercises for the upper-back. So do both the Inner Back-arm Exercises (pages 51 and 52) ; for, as we go along, we now see more and more plainly how much the limbs and some parts of the body work together, and that there are few exercises for any part of the arms or legs which do not set some muscles of the body also at work, and that one exercise often sets many parts at work.

Questions.

1. Describe the Third Upper-back Exercise.
 2. How should you breathe ?
 3. How should the dumb-bells be held all the time during this exercise ?
 4. How far behind you should you swing them ?
 5. How should the arms be held ?
 6. How long should you hold the dumb-bells behind you ?
 7. How many times daily should you thus swing them the first week ?
 8. How many times the second week ?
 9. How many times a day after that ?
 10. What part of the body does this exercise develop ?
 11. What do we now see as to the working of some of the muscles of the body, whenever we use some of those of either the arms or legs ?
 12. What as to the working of some of the arm or leg muscles, when we use any part of the body ?
-

SECTION IV.

FIRST HOME EXERCISE FOR THE UPPER-BACK AND TO BROADEN THE SHOULDERS.

Let us look, while passing, at two very simple exercises for the upper-back, which can be practised at home for a minute or two daily if you have a horizontal bar or the rung of a ladder, or other good piece of wood, hung a little higher than you can reach.

Directions.—1. Place the bar about three inches higher than you can reach.

2. Then spring up and catch a firm hold of it with both hands, keeping them close together, with your knuckles turned away from you, but with your finger-nails turned towards you.

3. Keep the chin up as high as you can, and slowly breathe very large breaths.

4. Remain hanging in this way without bending your elbows, and with your body hanging straight down, as in Fig. 27, until you slowly count twenty-five, all the time breathing just as slowly and fully as you can.

5. Then drop easily to the floor, always landing on your toes and soles—never on your heels.

Each day the first week hang thus until you slowly count twenty-five, and daily the second week until you slowly count fifty, and a whole minute each day after that right along.

This is capital work both to expand the chest and broaden the shoulders, and, after the first month, can scarcely be practised too much out of school. You will be surprised after the first month to find how long you can hang in this way. One man claims that he made his chest three inches larger around in one month just by this exercise.



Fig. 27.

Questions.

1. What do you need to have for the practise of these home exercises for the upper-back ?
2. Describe the First Home Exercise for the Upper-back.
3. How high should the bar be placed ?
4. How should the hands be held in this exercise ?
5. How should you breathe during it ?
6. How long should you thus hang each day the first week ?
7. How long daily the second week ?
8. How long each day after that ?
9. Name two of the effects of this exercise.
10. How much did one man increase the girth of his chest by this exercise in one month ?

SECTION V.

SECOND HOME EXERCISE FOR THE UPPER-BACK AND TO
BROADEN THE SHOULDERS.

Directions.—1. Breathe a few slow, deep breaths, holding your chin up high.

2. Now spring up and catch the bar with both hands, as in the last exercise—only this time at once let go with your left hand, and hang by your right hand only, letting your left hand hang down easily at your side.

3. So hang till you slowly count ten, and then drop on your toes and soles—not on your heels.

4. Rest sixty seconds, *always standing with your chin up high, and breathing slowly when you are resting.*

5. Now spring up and catch hold of the bar in the same way; but this time let go with your right hand, and hang on with your left, only the right hanging down easily at your side. So hang until you slowly count ten.

Each day the first week hang in this way with each hand till you slowly count ten. The second week hang each day in the same way with each hand till you slowly count twenty. After the second week, hang thus daily by each hand until you slowly count thirty.

This work is good, not only to make the muscles on the back, right under the arms, large and strong, but *it directly helps to make the shoulders broad, and well-shaped as well.*

Questions.

1. Describe the Second Home Exercise for the Upper-back.
2. How long should you thus hang by each hand during the first week?
3. How long each day the second week?
4. And how long daily after that?
5. What is the effect of this work?

SECTION VI.

VARIETY OF WORK FOR THE UPPER - BACK.

There are many out-door exercises which call the upper-back and the back of the shoulder into active play, and help to make them strong and shapely :

1. Throwing a ball or stone uses the whole front side and back of the shoulder with which you throw.
2. Rowing does the same for the backs of both shoulders—indeed, for the whole upper-back.
3. So does pulling at the rowing weights.
4. Sawing wood.
5. Mowing with a scythe, not a lawn-mower.
6. Stooping over and picking up any heavy weight from the ground.
7. Throwing stones behind you as far as you can with the hand swung swiftly past your side, not up over your shoulder.
8. Carrying a weight in both hands, held behind you, and up off your body.
9. Pulling with both hands on a rope, either downward or horizontally—indeed, in almost any direction, as in
10. The tug-of-war, or in
11. Mounting a rope, or hanging-pole, hand over hand.
12. Swinging on one ring, or on two.
13. Catching the bar with one hand or both, and trying to pull up till you touch your chin.
14. Standing facing the pulley-weights in the gymnasium, and pulling them out many times, till your hands are far past your body ; or, better yet, doing the same thing first with one hand and then with the other, but always keeping the elbows straight.

These and many other exercises can easily be practised a little while every day, after you have been strengthened in these muscles by a month at the regular exercises above described ; and you may fairly expect, before many months, to find your upper-back getting much stronger, fuller, and better-shaped than it ever was before, unless you have been long

used to work which exercised the upper-back. See how vigorous exercise greatly enlarged many chests, arms, shoulders, and backs during only a few months, as shown in Appendix, Tables I. to VII.!

But one thing you will want to avoid. If you give one muscle or set of muscles too much to do, and keep at it for months and years—as many hard-working men and women do—by-and-by the part so used gets to be, and to look, too large for the rest of your body. For instance, if you give your upper-back a great deal of hard work to do, and do not give the front of your chest about as much to do, you will not only tend to get round-shouldered, but the front of your chest will be likely to flatten, and sink in somewhat as well.

Men who row many races—who care far more to win races than to become well-built, deep-chested, hearty men—often do so much more of rowing than of any other kind of hard work that they get out of shape in this way, especially if they do not row with their heads held back.

Questions.

1. Name as many out-door exercises as you can which are good for the upper-back.
2. What kind of mowing develops the upper-back?
3. How should the elbows be held in pulling out the pulley-weights, if you wish to make your upper-back strong?
4. How long would it be well to practise the easier exercises for the upper-back before you try the harder ones?
5. After practising these harder exercises for a few months, what may you fairly expect to find in regard to your upper-back?
6. What will you need to avoid in muscular exercise?
7. If you give any muscles far more to do than others have, and keep on doing so for months and years, what effect will this have on these muscles which get so much more work than the rest?
8. If you give your upper back a great deal of hard work, and do not give the front of your chest nearly as much, what effect will this have on your figure?

REVIEW.

1. If you put your hands behind you, on what part of your shoulders does it set the muscles at work ?
2. How can you make the backs of your shoulders well-shaped and strong ?
3. What other part of your body will this exercise strengthen ?
4. What effect will it have on the shape of the upper half of the back ?
5. What is a narrow back likely to lack ?
6. How will it generally look ?
7. Describe the First and Second Upper-back Exercises.
8. What part of the neck does this exercise set at work ?
9. What three parts of the back ?
10. How can you tell with one hand what part of the back this exercise takes ?
11. How far back of you should you swing the dumb-bells in the Third Upper-back Exercise ?
12. How do you do the First Home Exercise for the Upper-back ?
13. How high should the bar be placed ?
14. How should the hands be held ?
15. How long should you thus hang each day after the second week ?
16. Name two of the effects of this exercise.
17. How long should you hang by each hand daily the first week in the Second Home Exercise for the Upper-back ?
18. What muscles of the body are made large and strong by this exercise ?
19. What does it do to the shoulders ?
20. Name as many out-door exercises as you can which are good for the upper-back.
21. How long would it be well to practise the easier exercises for the upper-back before trying the harder ones ?
22. What will you need to avoid in muscular exercise ?
23. If you keep working some muscles more than others, what will the effect be ?
24. If you give your upper-back much hard work and the front of your chest but little, and continue doing so, what will the effect be on your figure ?

PART V.—THE SMALL OF THE BACK.

SECTION I.

GENERAL REMARKS.

WE come now to a part not very large—too often not large enough, indeed—called the “small of the back,” or back of the waist—but, at the same time, one of the most important parts of the whole body. However strong anywhere else a man may be, *if he has not a well-knit, well-built waist he is not a thoroughly strong man.* A broad-shouldered man with a small waist will be thrown in a wrestle by a larger-waisted man with narrower shoulders, if the two men are equally tough, muscular, and used to wrestling. He will be out-rowed by a strong-waisted oarsman, out-mowed by a strong-waisted mower. Any laborer with pick, spade, or bar, who has a square, well-built waist, will tire him out in his line long before the day is over. A strong-waisted man will be almost certain, if equally well trained, to out-walk him, out-run him over long distances, out-jump him—indeed, beat him at almost any sort of foot-work calling for strength and staying power, and for the simple reason that the small-waisted man is not as well-built as the other in a part called into very active use in these kinds of hard work. His broad shoulders are showy, and likely indicate that some of his ancestors were very strong people; but he has kept the shoulders and lost the powerful waist, mainly because he has not given his waist enough to do. So his shoulders become almost a burden to him, and are in

his way, because he lacks the power to carry them about easily and long at swift, hard work. But build his waist up till it gets to be square, and strong, and well-knit, and give him what he often lacks, namely, a good pair of legs as well, and he will tell you himself how much stronger he is than he used to be, and how much more he can do. Indeed, his heart, lungs, stomach, and most of his other vital organs have more room now than they used to have, when his waist was pinched; and so he has gained not only more strength of muscle, but more vitality as well.

Renforth, Courtney, and Hanlan, very famous oarsmen; Rowell, the great pedestrian; Dr. Winship and William B. Curtis, each of whom at one time lifted more than a ton; and many other men of great power or great endurance in various kinds of athletic contests and severe trials of their strength or stay, have been noted for their well-made and very powerful waists.

What, then, does the back of the waist do? It is the part you use most when you stoop over to pick up a heavy weight. The laborer uses it when he lifts a rock or a log, or picks up a spadeful of earth or a forkful of hay. The porter uses it when he lifts a heavy trunk with both hands. When you row, here, more than in any other part, is where you want to be surely strong (and not in the back of the waist only, but in the whole waist), for here comes the hardest of the pull.

Let us, then, have two or three simple exercises for this valuable part of the body.

Questions.

1. Can one who has a weak waist be thoroughly strong?
2. Which of the two could out-row the other, if they were in other respects equally strong—a broad-shouldered man with a small waist, or a strong-waisted man with narrow shoulders?
3. Name some ways in which a strong-waisted man, if equally well trained, will outdo a slim-waisted man?

4. What is the reason of this ?
 5. What are broad shoulders likely to indicate ?
 6. If a man has broad shoulders, but a small waist, where will he lack power ?
 7. If he build up his waist and legs by hard work, how will he be ?
 8. What effect will it have upon his heart, lungs, and other vital organs ?
 9. What, then, has he gained ?
 10. Give instances of men famous for great power or endurance.
 11. What kind of waists had they ?
 12. What kind of work, then, does the back of the waist do ?
 13. What kind of waist must a strong oarsman have ?
-

SECTION II.

FIRST EXERCISE FOR THE BACK OF THE WAIST.

Directions.—1. Place the two dumb-bells on the floor in front of you.

2. Stand with the feet about eight inches apart, and breathe three slow, deep breaths.



Fig. 28.

3. Now, stooping down, take one of the dumb-bells in each hand, as in Fig. 28, and gradually rise till you are standing up straight, and your hands are hanging easily at your sides.

4. Now, bending slowly forward, lower the dumb-bells steadily until they are on the floor.

5. Repeat this six times.

Do this six times each day the first week without stopping, twelve times daily the second week, and fifteen times a day after that right along.

You will soon find now that the small of your back is very actively at work.

Questions.

1. Describe the First Exercise for the Back of the Waist.
2. How should you breathe before beginning this exercise?
3. Should you raise the dumb-bells quickly or slowly?
4. How many times should this be done daily the first week?
5. How many times each day the second week?
6. And how many times daily after that?

SECTION III.

SECOND EXERCISE FOR THE BACK OF THE WAIST.

Directions.—1. Standing erect, hold a dumb-bell on the back of your neck with both hands, as in Fig. 29.

2. Keeping a firm hold of the dumb-bell, so that it will not slip off, now stoop slowly forward till your body is leaning far over in the position shown in Fig. 30.

3. Rest there till you slowly count ten.

4. Then slowly rise till you are up straight.

5. Rest again till you count ten.

6. Then bend slowly downward, and rest as before.

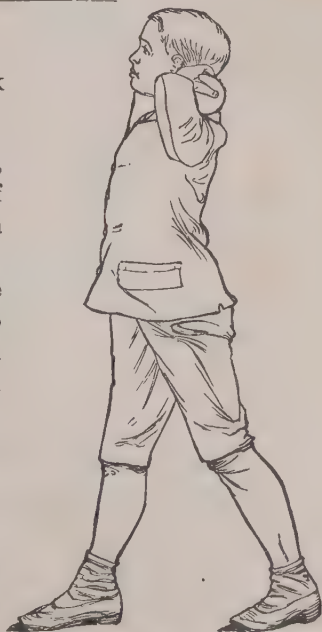


Fig. 29.

7. Stand straight again, first inhaling a full breath.
8. Repeat this six times.



Fig. 30.

Do this six times daily the first week without stopping, ten times daily the second week, and fifteen times each day after that right along.

Questions.

1. Describe the Second Exercise for the Back of the Waist.
2. How should the dumb-bell be held in this exercise?
3. How many times should you so bend and then raise the dumb-bell each day the first week?
4. How many times daily the second week?
5. How many times each day after that right along?
6. At what time in this exercise should you inhale a deep breath?

SECTION IV.

THIRD EXERCISE FOR THE BACK OF THE WAIST.

Directions.—1. Breathing slow and very full breaths, lean far forward with a dumb-bell in each hand, as in Fig. 31.

2. Keeping in this position, walk slowly up the aisle, down the next aisle, and back to the point of starting.

Walk that far in the same way daily the first week, twice

as far daily the second week, and three times that distance daily after that.

These are simple and rather easy in-door exercises to help make the back of the waist strong and well-shaped. After thus working at them not over a minute or two a day for the first month, your back will be already tougher, and fitter for something worth calling work.

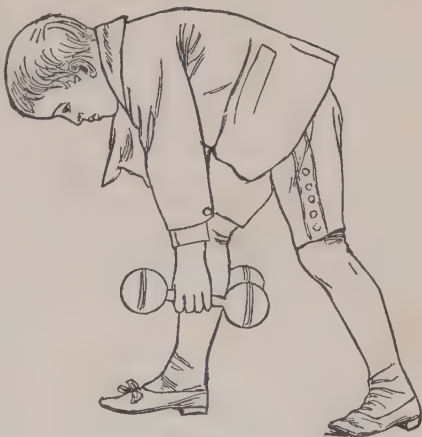


Fig. 31.

Questions.

1. Describe the Third Exercise for the Back of the Waist.
2. How should you breathe during this exercise ?
3. How should you walk during it ?
4. How far should you walk thus each week from the time you begin ?
5. Are these last-named three exercises hard to do ?
6. Yet what do they do for this important part of the body, even in the first three or four weeks ?

SECTION V.

VARIOUS OTHER EXERCISES FOR THE BACK OF THE WAIST.

Out of doors there is a great variety of work, all excellent for the back of the waist. Such as

1. Weeding.
2. Shovelling earth, coal, snow, or other heavy substance.
3. Mowing with a scythe.

4. Pitching hay or grain.
5. Picking up any good-sized stone or other weight from the ground with both hands.
6. Sawing wood with a two-hand saw.
7. Rowing.
8. Wrestling.
9. The tug-of-war.
10. Prying up a heavy weight with a bar of wood or iron.
11. Carrying a heavy weight, like a sack of grain, not on your shoulders, but on your back.
12. Trying to get a stick away from another boy or girl about as strong as you are.

These are some of the exercises which tend to make not only the back of your waist strong, but to make the whole back strong, and well-shaped also.

But some of them, especially the tug-of-war, should not be practised at all at first, at least without great care, until the muscles brought into action are first made strong and built up by lighter work, such as the exercises just described.

While *there probably never was an exercise devised that brings nearly all the muscles of the body and limbs into play*—though you often see it claimed for various exercises—still, in many of these for the back of the waist, we have set at work the hands, some of the muscles of the arms and shoulders, about the whole of the back, and, as we shall see presently, some of the muscles of the legs.

Questions.

1. Name as many exercises as you can for the back of the waist.
2. Besides making the back of your waist strong, what else do these exercises do for you ?
3. When should some of the harder ones of these be practised ?
4. Name one of which this is especially true.
5. What other muscles besides those of the back of the waist are set at work in these exercises ?
6. Is it probable that there ever was an exercise which brought into play all the muscles at once ?

PART VI.—THE SIDES.

SECTION I.

FIRST SIDE EXERCISE.

WE are now nearly through with the arms, shoulders, neck, and back.

Before trying some work for the front of the body and for the legs, let us look at the sides of the waist. Whenever you have to hold yourself up erect, these side muscles are among those which help keep you so, and whenever you lean over to one side, you at once set them at work, for they help to keep you from falling over.

Directions.—1. Stand with your arms akimbo, and your chin up.

2. Have the feet about a foot apart.

3. Now lean slowly far over to the left till you are in the position as shown in Fig. 32.

4. Rest there a moment ;



Fig. 32.

then rise till you are up straight, and, instead of stopping there, keep moving your body till it leans over as far to the right side.

5. So sway over first to the left side, and then to the right, till you have gone each way six times.

Sway that many times each day the first week, and ten times each day the second week, and fifteen times daily after that.

You will soon find that this exercise, besides making these muscles stronger, also makes it easier for you to stoop over sideways than it used to be, unless you have already done similar work.

Questions.

1. When you hold yourself up straight, what muscles of the body help keep you so ?
 2. When you lean over sideways, what do these muscles of the sides do ?
 3. Describe the First Side Exercise.
 4. How many times should you thus sway each way daily the first week ?
 5. How many times each day the second week ?
 6. And how many times daily thereafter ?
 7. Name two effects of this exercise.
-

SECTION II.

SECOND SIDE EXERCISE.

Directions.—1. Take a dumb-bell in your right hand, and hold it up high over your head.

2. Stand with the chin up high all the time.

3. Breathe a full, deep, slow breath.

4. Now slowly lower the dumb-bell, not down to your right shoulder, but across, above your head, and down over your left shoulder, as low as you can, till it touches your shoulder, letting your body tip over to the left, as in Fig. 33.

5. Hold it there till you slowly count ten.

6. Now bring it back up over-head again. Then do the same with the dumb-bell in your left hand.

7. Do this five times with each hand.

Repeat this five times each day the first week, eight times daily the second week, and twelve times daily after that right along.

This will be found harder work than the last exercise, especially for the muscles at the sides.

Questions.

1. Describe the Second Side Exercise.
2. How should the chin be held during this exercise ?
3. How should you breathe ?
4. How long should the dumb-bell be held in the position shown in Fig. 33 ?
5. How many times daily the first week should this exercise be taken with each hand ?
6. How many times each day the second week ?
7. How many times daily after that ?
8. How does this exercise compare with the First Side Exercise ?



Fig. 33.

SECTION III.

THIRD SIDE EXERCISE.

Directions.—1. Hold the dumb-bell in your right hand, across, over the left shoulder, as in Fig. 33.

2. Hold the chin up high all the time.

3. Keeping the dumb-bell there, breathe slow, deep breaths,

and walk steadily up the aisle and down the next one, till opposite the starting-point.

4. Then change the dumb-bell into your left hand, hold it over your right shoulder, turn and walk back to the starting-point.

Repeat this walk daily the first week. The second week, with the dumb-bell in your right hand, walk as before, daily up the aisle, down the next aisle, and back to the starting-point, before you change hands. Then change and walk the same distance with the dumb-bell in the other hand. Daily after that walk once around the room, holding the dumb-bell in the same way in the right hand. Then go the same distance with the dumb-bell held in the same way in the left hand.

It will not take long to see, or rather to feel, that this exercise is stretching your sides, and making them stronger in a way quite unusual to many girls and boys. And this very stretching, done thus carefully, and increasing little by little, will not only bring strong and shapely muscles on the sides of the waist, just above the hip-bones, but will also benefit the stomach, bowels, and other vital organs, by giving them more room and ease of action than they have when the body is at all bent down or the waist drawn in, as it is far too often by most boys and girls when they are sitting down, and even when standing or walking—and by most men and women, too, for that matter.

Questions.

1. Describe the Third Side Exercise.
2. How should the chin be held during this walk ?
3. How far should you thus walk with the dumb-bell in your right hand ?
4. What should then be done with the dumb-bell ?
5. How should you breathe throughout this exercise ?
6. How far should you thus walk each day the second week ?

7. How far daily after that ?
 8. What will this exercise do to the sides ?
 9. How will it benefit many of the vital organs ?
 10. What is a common fault of boys and girls, and of men and women also, in the carriage of their bodies ?
-

SECTION IV.

VARIOUS OTHER EXERCISES FOR THE SIDES OF THE WAIST.

1. Hang by both hands from a bar, rings, or branch overhead, keeping the feet together and the knees straight, and swing the legs far up to the right side, then up to the left.
2. Or simply hang by one hand, letting your feet hang straight down.
3. Or go up a rope hand over hand.
4. Or, on the horizontal ladder, catch hold of two rungs as far apart as you can comfortably reach, and then, letting go with your left hand only, swing over till you can catch another rung as far over to the right side of your right hand as the one your hand just left was to the left of it; and then repeat.
5. Wrestling of almost any kind pulls hard, often violently, on these side muscles, and good wrestlers are sure to be strong and well-shaped here.
6. Rowing needs strong sides, but not so much as wrestling does.
7. So does playing tennis.
8. Pushing a dumb-bell or other weight up over the head, with one hand, brings into action that side of the waist a little, and of the other side a good deal.
9. Walking with the two dumb-bells, or any other weight, held high up over your head, soon takes vigorous hold here at the sides.
10. So does carrying a sack of salt, grain, or other heavy material on one shoulder ; or a trunk, as porters do ; or a side of beef, or two or three sheep, or other heavy weight of meat, as the beef-carriers do in the markets. Indeed, this is one of the best exercises known for making the waist shapely and powerful—that is, if you practise carrying these weights as often on one shoulder as on the other.

11. Fencing.
12. Boxing.
13. Single stick.
14. Walking erect, and rapidly, for a long distance.
15. Running, not flat-footed, but on the soles and toes.
16. Jumping.
17. Skating, where you lean far over, as in the outer roll, either forward or backward.
18. Dancing.
19. And, better than almost any of these, hopping on one foot.

These all make the sides of the waist strong, and any of them, practised vigorously and faithfully for a few minutes a day, will go far, before even one year is over, towards building a weak and shaky-looking waist into a firm, well-knit, and shapely one, so helping to hold the body easily erect, whether one is sitting, standing, walking, running, jumping, hopping, or skating.

Questions.

1. Name various other exercises for the sides of the waist.
2. Describe an exercise on a horizontal ladder which is excellent for the sides.
3. What kind of waists do good wrestlers have ?
4. Of which side does pushing up a dumb-bell with one hand take hold the more, the side under the pushing hand or the opposite side ?
5. Name a dumb bell exercise which takes hold of both sides.
6. What is one of the best exercises known for bringing a shapely and powerful waist ?
7. What sorts of walking take hold of the sides of the waist ?
8. What kind of running does the same thing ?
9. What kind of skating ?
10. And what exercise is better than almost any of these for improving the size and shape of the side muscles ?
11. If any of these exercises are practised faithfully a few minutes daily, what results may be expected, even in one year ?

REVIEW.

1. Can one who has a weak waist be thoroughly strong ?
2. Which of the two could out-row the other if they were otherwise equally strong, a broad-shouldered man with a small waist, or a strong-waisted man with narrow shoulders ?
3. What are broad shoulders likely to indicate ?
4. What will making one's waist larger and stronger help to do for his heart, lungs, and other vital organs ?
5. Besides increased vital power, what else does he gain ?
6. Give instances of men famous for great power and endurance.
7. What kind of waists had they ?
8. What kind of work does the back of the waist do ?
9. Describe the First Exercise for the Back of the Waist ?
10. Name as many exercises as you can for the back of the waist.
11. Besides making the back of your waist strong, what else do these exercises do for you ?
12. Name other muscles these exercises set at work.
13. Is it probable that there ever was an exercise which brought into play all the muscles at once ?
14. When you hold yourself erect, what muscles help keep you so ?
15. When you lean over sideways, what do these side muscles do ?
16. How do you do the First Side Exercise ?
17. Mention two results you will soon find from this exercise.
18. Describe the Second Side Exercise.
19. How does this exercise compare with the First Side Exercise ?
20. What is a common fault of boys and girls, and also of men and women, in the carriage of their bodies ?
21. Name as many other exercises as you can for the sides of the waist.
22. Name a dumb-bell exercise which takes hold of both sides.
23. What is one of the best exercises known for making a shapely and powerful waist ?
24. What kinds of walking makes the sides of the waist strong ?
25. What kind of running ?
26. What kind of skating ?
27. Name a better exercise than any of these last three for improving the size and shape of the side muscles.

PART VII.—THE CHEST.

SECTION I.

GENERAL REMARKS.

ON the front of the body there are two important sets of muscles, larger than the others—namely, those across the upper part of the front of the chest between the shoulders, and those across the abdomen. There are also small muscles between the ribs, which are brought into action either by deep breathing, or by putting the hands high over the head, or by anything, in short, which tends to stretch the ribs apart. But so many other exercises bring these little muscles into play, that special work for them need not be mentioned here.

The muscles across the upper part of the front of the chest, between the shoulders, are highly important in a variety of ways. Weak-chested persons of either sex are likely to have these muscles weak. On the other hand, these muscles are sure to be full if the chest is well-set, and the arms are well-made, shapely, and strong. For the muscles of the arm and those of the upper half of the body so work together, that you can scarcely use any of the one—save some of those of the fore-arm—without at once setting the others in action. Oddly enough, too, whether you use the biceps or the back-arm, you set the muscles on the front of your chest at work.

With these full and strong, it is far easier to hold the chest out than when they are thin and weak; indeed, they seem to help keep the chest out, without much effort on their owner's

part. And this holding the chest out is of great benefit—so great that, *if done most of the time, it sometimes even saves one's life*. For the greater part of the work of millions of men and women for many hours daily is done while they are sitting, and with their heads only, or with the hands doing very light work, as a woman's hands in sewing, or a man's in writing. When working thus they breathe small, partial breaths, so only *partly filling the lungs*. And, as the lungs take up most of the room within the larger ribs—that is, in the chest—if you only give the lungs half-work to do, both they and the chest grow small, and often weak. Then their owner is likely to get weak likewise, is more liable to take cold, and, if the cold, as it often does, gets on his lungs, it is far more likely (as we have seen on page 4) to become dangerous and even fatal than it would be were his lungs full, large, and well-used.

But making these muscles on the front of the chest large and strong helps to make and keep the chest full and well-shaped, while the deep breathing, which almost any vigorous exercise forces us to do, also aids greatly in the same way, and brings us by-and-by the large and healthy lungs so desirable for all.

In most boys and girls—though they may not know it—these muscles across the front of the upper part of the chest are weak, far weaker than they ought to be. One or two proofs of this will be shown presently.

Though there are other muscles on the chest besides these, and though these are only on the upper part of the front of the chest, yet for brevity we will call the exercises for these muscles “chest exercises.”

Questions.

1. Name two important sets of muscles on the front of the body.
2. What class of persons are likely to have the muscles across the upper part of the front of the chest, weak?

3. If the chest is well set and the arms are strong, how are these chest muscles sure to be ?

4. Why so ?

5. When you use either the biceps or back-arm, what muscles on the chest do you at once set in action ?

6. If these chest muscles are large, what effect does it tend to have on the way in which you hold the chest ?

7. What good does it do to hold the chest out ?

8. In what position do many persons spend much of their time ?

9. Mention kinds of work in which this is the case.

10. How do they breathe when at such work ?

11. What organs take up most of the room in the chest ?

12. If you give the lungs only half work to do, what will be the result ?

13. What will be the effect on their owner ?

14. What will this getting weak make one liable to do ?

15. How does vigorous exercise cause us to breathe ?

16. What does this deep breathing do to the lungs ?

17. Do most boys and girls have these chest muscles strong or weak ?

18. What will we call the exercises for these muscles across the upper part of the front of the chest ?

SECTION II.

FIRST CHEST EXERCISE.

Directions.—1. Take a dumb-bell in each hand, and stand with the chin as high as you can.

2. Do not bend the knees at all.

3. Curl the dumb-bells.

4. Then push them high up over your shoulders.

5. Hold them there a moment.

6. Breathe a deep and full breath.

7. Hold your chest out full, and gradually lower the dumb-bells far out sideways, without bending the elbows, until your arms are level with your shoulders, as in Fig. 26, page 73.

8. Hold them there till you count ten.

9. Keep the chin up high all the time.
10. Then raise them overhead again.
11. Repeat this five times.

Do this exercise five times daily the first week, eight times daily the second week, and ten times each day after that.

This is excellent work to enlarge and raise the chest itself, as, for instance, to take a flat or hollow chest and make it high and full, and to build up and strengthen the muscles across the front of the upper part of the chest—and these are, to most of us, very important things.

Questions.

1. Describe the First Chest Exercise.
2. Should the knees be bent in this exercise ?
3. While the dumb-bells are high over the head, how should you breathe ?
4. How should the chest be held ?
5. In what direction should you lower the dumb-bells in this exercise ?
6. How far down should you thus lower them ?
7. How long should you thus hold them stretched out ?
8. How many times should this exercise be practised each day the first week ?
9. How many times daily the second week ?
10. How many times each day after that ?
11. Name two good effects of this exercise.

SECTION III.

SECOND CHEST EXERCISE.

Directions.—1. Take a dumb-bell in each hand.

2. Stand erect.
3. Face the ceiling right overhead.
4. Breathe slow, deep breaths.
5. Curl both dumb-bells, not in front, but as far out at each

side of you as possible, and without touching the elbows to the sides.

6. Repeat this six times.

There is no need of urging you to hold the chest out in this exercise, because you cannot help doing so, if you practise the exercise as directed.

With light dumb-bells, beginning with a few strokes daily, and gradually doing more as the muscles in use get stronger, you not only avoid hurting the chest, but you bring it great benefit—and not only the chest, but you benefit nearly all the vital organs in the body as well.

Curl the dumb-bells in exactly this way six times each day the first week without stopping, ten times daily the second week, and fifteen times each day after that.

Also, if you have dumb-bells at home (as it would be well to do), you will get on all the faster if you do the same thing there each morning and evening.

One thing more. If in curling in this way six times daily the first week you found that you took three breaths, though you tried to breathe deeply and slowly, now see if in the second week you cannot curl ten times in the same number of breaths, or even in two breaths. The value of this practice of taking the largest breaths you can, and holding the air in at each breath as long as you can, in almost all kinds of work that call the muscles into action, has already been seen on page 19.

Questions.

1. Describe the Second Chest Exercise.
2. How should you face in this exercise?
3. Should the dumb-bells be curled in front of you?
4. While thus curling, should the elbows at any time touch the body?
5. How will the chest necessarily be held if you practise this exercise correctly?

6. What effect does this exercise have on the vital organs ?
 7. How many times should you thus curl the dumb-bells daily the first week ?
 8. How many times each day the second week ?
 9. How many times daily after that ?
 10. How many times daily at home also, if you have dumb-bells there ?
 11. How should you try to breathe during this exercise after the first week ?
 12. Name some of the advantages of deep breathing while exercising, as mentioned on page 19.
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SECTION IV. •

THIRD CHEST EXERCISE.

Directions.—1. Stand in the aisle, between two desks or benches, not over two feet apart, and put one hand on each.

2. Now, keeping your hands on these desks, walk backward two steps, and stand there.

3. Keeping your chin up, and your body and knees at the same time stiff and straight, gradually bend your elbows and lower your body till your chest touches your thumbs, as in Fig. 34.

4. Push slowly upward, then lower again.

5. Repeat this five times.

Do this five times daily the first week without stopping, ten times daily the second week, and fifteen times daily after that.

At home, to get this same exercise, simply place two strong chairs about two feet apart, put one hand on the seat of each, as in Fig. 11, page 38, and follow the above directions.



Fig. 34.

Questions.

1. How do you do the Third Chest Exercise ?
2. How far back do you step ?
3. How far down should you lower your chest in this exercise ?
4. How many times daily should this be done the first week ?
5. How many the second week ?
6. How many after that ?
7. How can this same exercise be had at home ?

SECTION V.

FOURTH CHEST EXERCISE, OR HALF-DIPPING.

After following up the last two exercises as directed, for a minute or less daily for six weeks, the muscles on the front of your chest will be strong enough to try something harder.

Directions.—1. Stand between two desks, which should not be over two feet apart, and seventeen inches would do better.

2. Place one hand on each desk.

3. Breathe a deep, full breath, and hold it in.

4. Taking your feet off the floor, and resting your weight on your hands, lower slowly and steadily, not till your knees reach the floor, but till they are about half-way down, as in Fig. 35.

5. Rest there till you slowly count three.

6. Then raise yourself up, simply by pushing on the desks, till your arms are straight again.

7. Do not let the feet touch the floor at any time during the exercise, but keep them together and well out behind you.

8. Repeat this twice.

Do two of these half-dips daily the first week, five each day the second week, and seven daily the third week. On the fourth week try something harder yet.

Questions.

1. Describe Half-dipping.
2. How many weeks should pass, in which you are practising the previous chest exercises, before you try this one?
3. How should the chin be held?



Fig. 35.

4. Where does the weight rest in this exercise ?
 5. How low should you dip ?
 6. How should the feet be held ?
 7. How many such half-dips should be done each day during the first three weeks ?
-

SECTION VI.

FIFTH CHEST EXERCISE, OR DIPPING.

This exercise will be found fully described on pages 43-45.

After you get so that you can do six or eight dips without difficulty, *there is scarcely an exercise by which you can do your back-arms and the front of your chest so much good in so little time, or that it would pay you so well to practise several times a day as a pastime.* You will soon be delighted with the improved looks, size, and power this simple work, thus followed up vigorously—say, in all, for five minutes daily—will bring to your upper-arms, chest, and shoulders; for the broadening of your chest, of course, sets the shoulders off to better advantage, while it also gives them quite a share of the work to do, and thus improves their quality and size as well.

A list of many other exercises, nearly all excellent for the front of the chest, will be found on pages 49 and 50. It will be well to know by heart what muscles these different exercises call into action, as *you are thus almost sure to have at your command, wherever you are, one or more of them which you can practise handily, and with good results.*

Questions.

1. How do you dip ?
2. What parts does this exercise greatly strengthen ?
3. How often daily would it pay to practise it as a pastime ?
4. What does it do to the chest and shoulders ?
5. Name other exercises for the chest and shoulders.

SECTION VII.

THE VALUE OF A GOOD CHEST.

It should be borne in mind that the upper part of the back is as much a part of the chest as the upper part of the front of the body—in short, that your chest is your whole body from your neck to your waist.

Now, while these last few exercises have been bringing you fine muscles across the front of your chest, especially the upper part of it, there are three exercises which will be new to most boys and girls, yet which are each simple and admirable for the whole chest. And, in fact, there is scarcely any other exercise so valuable to most persons as that which expands and strengthens the chest itself, and thus brings more lung-power, more heart-power—indeed, more vital power generally; and for the reason that far the greater part of the work done by men out-of-doors—men who are farmers, mechanics, or laborers—tends to round their shoulders, and to make their backs much broader than the front of their chests, while a great majority of those whose work is done in-doors—professional men, merchants, bankers, clerks, and about all who get their living by their heads rather than their hands—do little or nothing to benefit their chests, or to help keep them full and deep; on the contrary, their very business and mode of life often tends to cramp and weaken them instead. Thus the out-of-door men, while often healthy, are not nearly so sturdy as they might be, while those in-doors lead a life which does not bring them nearly the strength of the out-of-door men—indeed, too often tends to weaken and break them down before old age.

Hence, if out-of-door boys and men will take a little, or, better yet, a good deal of special work to enlarge their chests

and make them stronger, they will be the better for it ; they will, as a British soldier who had been trying it found, “be fitter for anything they are called on to do ;” while to the indoor boys and men the advantage will be so great as to often not only keep them well, when they would otherwise break down with sickness, but to even insure to not a few a green old age, and a useful one as well. And in almost every particular is the same true of girls and women.

Thus far the exercises given for practice in the school-room are such as can be done either without any apparatus at all, or with only a cheap pair of dumb-bells, two desks, or a small stick. One of the three exercises for the whole chest can also be done with these same dumb-bells. What will be needed for the other two will be seen presently.

Questions.

1. What part of the body is the chest ?
2. What kind of exercises are especially valuable to most persons ?
3. Why so ?
4. Name classes of men who do little for their chests.
5. What will a good deal of chest exercise do for any one ?
6. How did the British soldier find that exercise affected him ?
7. Will exercise be equally beneficial to girls as well as boys ?

SECTION VIII.

THREE HOME EXERCISES FOR ENLARGING THE CHEST.—FIRST HOME CHEST EXERCISE.

Directions.—1. Lie flat on your back on the floor, or, better yet, on a mattress, pillow, or other substance easy to the back.

2. Take a dumb-bell in each hand, and stretch your arms up back of your head as far as you can, till the dumb-bells touch the floor, as in Fig. 36.



Fig. 36.

3. Breathe a deep, full breath, and hold it all in your chest.

4. Now raise the dumb-bells, and bring them clear over till they are as high as you can reach, as in Fig. 37, not bending the elbows once all the way.

5. Rest a moment. Then lift them back of your head again, inhale a full breath, hold it in, and raise them as before.

6. Repeat this three times.

Do this, in the first week, three times each morning soon after rising, and as many times before going to bed. The second week, do it five times each morning and evening, and after that ten times each morning and evening right along.

This is great work for the chest, the putting the arms over your head in this way, and the deep breathing at the same time, *causing you to expand your chest to its utmost capacity*—a thing, by the way, which many persons do not do once in a whole day, sometimes even in a whole month.



Fig. 37.

Questions.

1. Describe the First Home Chest Exercise.
 2. How should you breathe during this exercise ?
 3. How should the elbows be held ?
 4. How many times should you practise this exercise each week ?
 5. What is its effect on the chest ?
 6. How often do some persons breathe a full breath ?
-

SECTION IX.

SECOND HOME CHEST EXERCISE.

Now let us see to the new apparatus, which is so simple and easy that any boy, handy with tools, can quickly make it, and which it is well to have in every school-room and in almost every bedroom in the land. From the hardware man get four common pulleys, with wheels about four inches in diameter. Fasten them up, as shown in Fig. 38—that is, so that the outer pulley, *a*, is three feet from the inner pulley, *b*, and that the outer pulley, *d*, is three feet from the inner pulley, *c*. Pass a rope half an inch thick over *a* and *b*, and another over *c* and *d*. Cut each rope long enough to reach from the floor up over its two pulleys and down to about a foot above your head. To the ends, *b* and *c*, by smaller ropes, attach wooden handles, namely, straight, round, hard-wood sticks, each about three quarters of an inch or an inch thick and five or six inches long. Tie a dumb-bell or other weight on each floor-end of the rope. Now you are ready for exercise.

Directions.—1. Stand erect under the handles, and take one in each hand.

2. Hold your chin up as high as you can.
3. Breathe till your chest is full, and hold the air in.
4. Without bending the elbows or letting any air out of

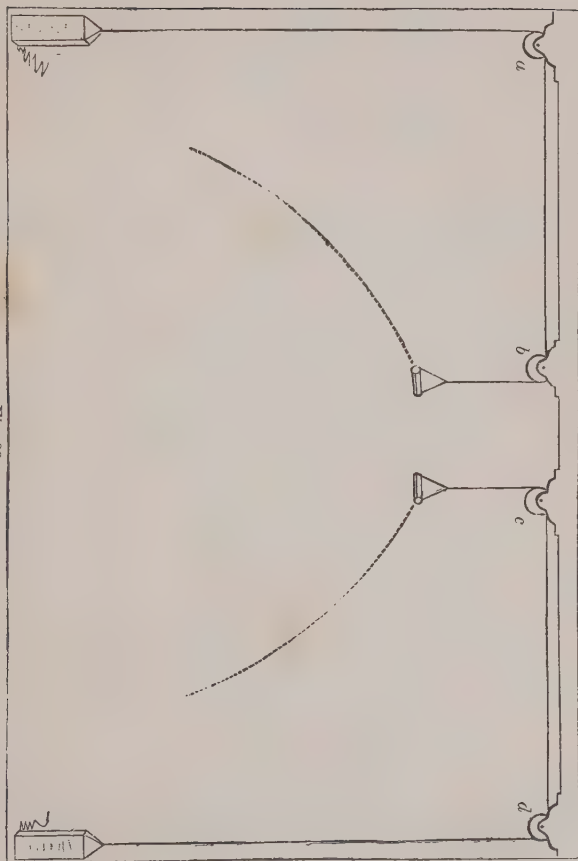


Fig. 38.

your chest, bear your hands steadily downward, keeping them as far out at each side as you can, until you bring the handles down near your sides. Now breathe out through your nose, and inhale another full, deep breath, and hold it.

5. Then lower the weights slowly, your hands going up along the same lines that they came down. Be sure to keep the chin up high all the time.

6. Repeat this ten times.

Do this exercise ten times daily the first week, fifteen times each day the second week, and practise it daily after that as many times as you can comfortably.

This is one of the best-known exercises to widen the chest ; to keep the chest up high where it belongs, instead of letting it sag down on the abdomen, and thus cramping both the vital organs in the abdomen and those in the chest itself ; also to make the chest full, well-shaped, and strong.

Questions.

1. Tell how to do the Second Home Chest Exercise.
2. How should you breathe during this work ?
3. Just after you get your hands down by your sides, how should you breathe ?
4. How should you lower the weights, swiftly or slowly ?
5. How should the chin be always held in this exercise ?
6. How often should you pull the weights down in this way each day the first week ?
7. How many daily the second week ?
8. How often daily after that ?
9. What three effects has this exercise on the chest ?
10. If you let your chest sag downward instead of holding it up high and full, what effect will this have both on the vital organs in the abdomen and on those in the chest itself ?

SECTION X.

THIRD HOME CHEST EXERCISE.

The other chest-apparatus is made thus :

With a bit of small rope, tie the middle of a piece of broom-handle about three feet long to one of the handles you have just been using. At the other end of the long rope fasten both dumb-bells. Now it is ready.

Directions.—1. Catch the ends of the stick, as in Fig. 39, holding the chin up very high all the time.

2. After two or three deep, slow breaths, just when you have breathed as full a breath as you can, hold your breath, keeping the lips shut, with your elbows straight and your arms nearly parallel, bring both hands straight down out in front of you till they are at your sides, as in Fig. 40.

3. Hold them there a moment.

4. Then let your hands go slowly up again the same lines till they are high overhead.

5. Again breathe a deep breath, and bear down as before.

6. Repeat this ten times.

Do this ten times daily the first week, fifteen times each day the second week, and as many times daily after that as you can comfortably.

The last exercise widened your chest. This one will deepen it from front to



Fig. 39.

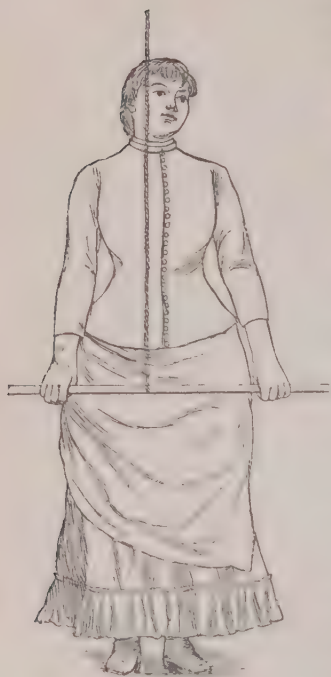


Fig. 40.

back, from breast-bone to back-bone. Hence it is, of course, just the thing for thin-chested people. But the chin must never, during this exercise, come down.

Questions.

1. Describe chest-apparatus No. 2.
2. How many dumb-bells should you use with this apparatus ?
3. Describe the Third Home Chest Exercise.
4. How far apart should the hands be held in this exercise ?
5. How should the chin be held throughout this exercise ?
6. How should you breathe while thus exercising ?
7. How should the elbows be held ?
8. How many times should this exercise be practised each day the first week ?
9. How many each day the second week ?
10. How many daily after that ?

SECTION XI.

RESULTS OF CHEST EXERCISE.

After the first month, when your muscles have become a little used to active work, and are not afraid of it, it will be well to spend at each of these three Chest Exercises periods of even two minutes two or three times a day, or six minutes in all. By doing this you will not only see, in less than a month, that your chest is getting larger and finer, but,

however weak it may have been at first, you will be very likely to find, before even one year is over—especially if you practise a few minutes of running or from half an hour to an hour of brisk walking every day, with the chin held up above the level, and breathing as slowly and fully as you can—that you are actually getting a good, if not even a fine, chest. You will also find that, instead of getting short of breath easily, when called on to make a vigorous effort—such as walking up two or three flights of stairs, or running to a boat or train—you can now keep your breath in for a long time, and do far more work than before. For, while getting your fore-arm, or the upper-back, or any other part strong is only making you strong in one or two places, this making the chest broad and deep and full tends directly to make you strong all over—for *you breathe larger breaths now than you used to do, and your heart has a larger house to work in, and does better work than when you had only a small and cramped chest.*

But this deep breathing and better heart-work make your blood flow better through your body and limbs, keeping the hands and feet warm, where often before they would have been cold, and making the stomach and other vital organs do their part with more vigor; so that whatever kind of work we have to do, whether with body or mind, we find it is getting far easier to do it than formerly, and that we can stay longer at it without tiring.

Questions.

1. After the first month of active exercise, how long a time daily will it be well to give to each of these three Chest Exercises?
2. What effect will this likely bring, even in less than a month?
3. What before the end of a year?
4. What daily out-of-door exercise will greatly aid these Chest Exercises in bringing you a fine chest?
5. What effect will this work have upon your breathing?

6. State the difference between making the fore-arm, or upper-back, or any part strong, and making the chest broad, deep, and full.
 7. Why does it thus tend to make you strong all over ?
 8. What effect have this deeper breathing and better heart-work on the circulation of the blood ?
 9. What effect on the hands and feet ?
 10. What effect on the vital organs ?
 11. What effect on our ability to do work of almost any kind ?
-

REVIEW.

1. What class of persons are likely to have the muscles across the upper part of the front of the chest weak ?
2. If the chest is well set and the arms are strong, how are these chest-muscles sure to be ?
3. Why so ?
4. When you use either the biceps or the back-arm, what muscles on the chest do you at once set in action ?
5. What good does it do to hold the chest out ?
6. In what position do many people spend much of their time ?
7. Name kinds of work in which this is the case.
8. How do they breathe while at such work ?
9. What organs take up most of the room in the chest ?
10. If you give the lungs only half-work to do, what will be the result ?
11. How does vigorous exercise cause us to breathe ?
12. What does this breathing do to the lungs ?
13. Do most boys and girls have these chest-muscles strong or weak ?
14. Describe the First Chest Exercise.
15. In what direction should you lower the dumb-bells in this exercise ?
16. How far down should you lower them ?
17. Name two good effects of this exercise.
18. How should the dumb-bells be curled in the Second Chest Exercise ?
19. How is the chest sure to be held during this exercise ?
20. After the first week, how many times should you try to breathe during this exercise ?
21. Repeat some of the advantages of deep breathing while exercising.
22. How do you do the Third Chest Exercise ?
23. How far down should you lower your chest in this exercise ?

24. How can this same exercise be had at home ?
25. Describe Half-dipping.
26. Where does the weight rest in this exercise ?
27. How low should you dip ?
28. How should the feet be held ?
29. Describe a dip.
30. Tell its effect on the chest and shoulders.
31. Name many other chest and shoulder exercises.
32. What part of the body is the chest ?
33. Name classes of persons who do little for their chest.
34. What will much chest exercise do for any one ?
35. Describe the First Home Chest Exercise.
36. How should the elbows be held in this exercise ?
37. What is the effect of this exercise on the chest ?
38. How do you do the Second Home Chest Exercise ?
39. How should the chest be held during it ?
40. Describe the Third Home Chest Exercise.
41. How far apart should the hands be held in it ?
42. How should the chin be held ?
43. After the first month, how long daily will it be well to practise each of these last three exercises ?
44. What effect will this likely bring before the end of the year ?
45. What daily out-door exercise will greatly aid these in bringing you a finer chest ?
46. Which will make you stronger all over, making any muscle strong, or making the chest itself broad, deep, and full ?
47. Why does it thus tend to make you strong all over ?
48. What effect has it on the vital organs ?
49. What effect on your ability to work ?

PART VIII.—THE ABDOMINAL MUSCLES.

SECTION I.

SOME OF THE USES OF THESE MUSCLES.

FOR only one other muscle, or, rather, pair of muscles, on the body will we have an exercise or two—namely, the layers or bands across the front of the waist known as the abdominal muscles. They are very important, not only helping us (with other muscles which lie at each side of them) to move the body in many ways, but, when made strong and kept so by daily exercise, greatly aiding the stomach, liver, kidneys, and bowels in doing their work, so helping to keep away dyspepsia, inflammation of the bowels, and other disorders far too common in all civilized lands.

These muscles help either to draw the body over forward, or to lift the legs upward. When lying on your back, you could not get up if these muscles did not help you to do so. Every time you lift your foot to walk you set them at work, and the higher you lift it—as, for instance, in jumping over a fence or other object, or in kicking a foot-ball—the more you give these muscles to do. If you are sitting on a chair, and lean forward over a desk to read or write, these are the muscles which draw you forward, or which, when you lean back, help keep you from falling over backward.

A man sitting on a seat and swaying forward and back, as in rowing, sets these muscles hard at work. Indeed, no one will ever be a fast rower for a long distance without great

power in them ; for, however strong his back and legs may be, to do the hard pulling, if he is weak here, he cannot reach forward quickly enough to pull without soon getting tired right in this part, and having to stop.

Whoever has these muscles small and weak will generally have a feeble gait, and will often lean forward a little when walking, as if too weak to stand up straight. But with a strong, high step, where, instead of lifting the heel only a little, and walking almost flat-footed or shuffling along the ground, as so many poor walkers do, you push well with the toes and sole of the foot, just as it leaves the ground, thus raising the heel high, you will find that you are giving these muscles good work to do. You are also making it easier for you to walk erect as well.

By thus walking erect you help keep your shoulders back, instead of pressing them over on your chest and cramping your breathing, so that when you have a long walk to take you do not get tired so easily as you would if you bent over more. One of the best walkers the world has yet seen—Daniel O'Leary—showed that he knew the advantage of thus stepping high, and throwing his waist forward and shoulders well back when he walked, for, as will be seen in the picture of him, Fig. 41, his waist is the part of his body which is most forward as he steps. Walking six whole days, and often far into the night besides, he left many others behind in the race, nearly all of whom, as they grew tired, stooped more and more forward, while, no matter how tired O'Leary was, his shoulders were always held well back and low down, and his waist out full and forward. Of course, too, this aided his stomach and bowels to do their work far better than if he had cramped them by slouching forward, as his rivals did.

Let us, then, try a little work for these very important muscles.

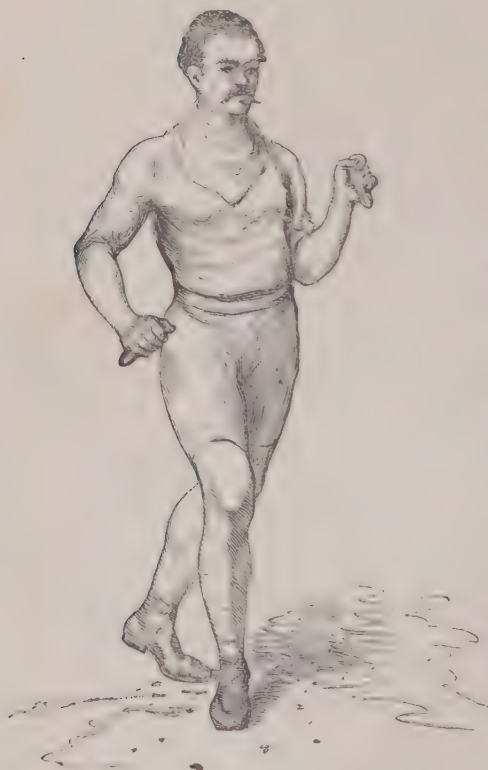


Fig. 41.

Questions.

1. What are the muscles across the front of the waist called ?

2. When they are daily made stronger by exercise, what vital organs are aided ?

3. What disorders will these exercises tend to keep away ?

4. What are some of the uses of these muscles ?

5. When lying on your back, what do they help you to do ?

6. How does common walking effect them ?

7. Name exercises which give them harder work to do.

8. In sitting at a desk to read or write, what part do these muscles do ?

9. Name an exercise which sets them hard at work.

10. What kind of abdominal muscles must any one have to be able to row fast over a long distance ?

11. If these muscles are weak, how will a rower soon be affected ?

12. If they are small and feeble, how will they affect a person's walk ?

13. Describe a strong, high step, which will give them much to do.

14. What effect does this erect walking have on your shoulders ?

15. Which kind of walking is most likely to tire you ?

16. Name a famous walker who always walks erect.

SECTION II.

FIRST EXERCISE FOR THE ABDOMINAL MUSCLES.

Directions.—1. Stand with the chin held high up.

2. Breathe slowly and very deeply.

3. Raise the right knee till the right foot is about a foot above the floor.

4. Then, giving a little spring with your left foot, raise it swiftly about a foot off the floor, at the same time putting your right foot down on the floor, but only its toe and sole, not its heel.

5. Then spring and raise your right foot, again putting the left down, and so go on, turn about, until you have sprung in this way five times with each foot.

Repeat this five times on each foot daily the first week, ten times on each foot daily the second week, and twenty times each day after that right along, and as many more as you can do with comfort.

Not only does this coming down on your soles and toes both avoid noise and help make you light-footed and springy, but this raising of the knee at once sets the abdominal muscles actively at work, and soon begins to bring it strength and size.

Questions.

1. Describe the First Exercise for the Abdominal Muscles.
2. After thus raising the knee, how should the foot be put down ?
3. How many times should each knee be thus raised daily the first week ?
4. How many times daily the second week ?
5. How many times each day after that ?
6. What two things does this coming down on the soles and toes do ?
7. What two effects does this raising of the knee have on the abdominal muscles ?

SECTION III.

SECOND EXERCISE FOR THE ABDOMINAL MUSCLES.

- Directions.**—1. Stand about six feet apart.
2. Fold your arms behind you.
3. Hold your chin up high.
4. Breathe slowly and so deeply that you seem to fill with air, not only your lungs, but your whole body.
5. Do not bend your knees.
6. Hold your left foot far out in front of you, as in Fig. 42.
7. Keep it there till you count five.



Fig. 42.

8. Then lower it to the floor, and raise the right foot in the same way.

9. Keep the shoulders as far back and as low down as possible. Indeed, not only in exercising, but always when sitting, standing, or walking, keep the shoulders down and far back, and the head up high. In this way you will all the time be making your chest fuller and more shapely, especially if you breathe as many deep, full breaths in a day as you can.

10. Repeat this four times.

Do this four times daily the first week with each foot, not bending either knee. The second week, do it six times a day, and after the second week ten times daily.

Do this slowly and with care, and you will at once feel what good work it is for these layers of muscle across the ab-

domen, while as a help to the right working of the vital organs within it is admirable.

Observe two things in this exercise. First, let your head and shoulders drop far backward. Second, do not draw the toes of your front foot up towards you, but point them as far downward and outward as you can.

Questions.

1. Describe the Second Exercise for the Abdominal Muscles.
 2. How should the arms be held during this exercise ?
 3. How should the chin be held ?
 4. How should you breathe ?
 5. How long should the foot thus be held a foot above the floor ?
 6. Should the knees be straight or bent ?
 7. How should your shoulders be held ?
 8. During the first week, how many times should this exercise be practised with each foot ?
 9. How many the second week ?
 10. How many after that ?
 11. How should this exercise be done ?
 12. What muscles does it benefit ?
 13. What effect has it on the action of the vital organs ?
-

SECTION IV.

THE TOE-STRAPS.

Directions.—1. Take two pieces of common leather strap, each about six inches long ; screw them to the base-board of your room, about six inches from the floor and parallel with it ; leave each strap loose enough in the middle to let you put the toes and forward part of one of your feet in it.

2. Sit facing these straps, on a stool or cassock about seven inches high, and put one foot in each strap.

3. Keep your chin up high all the time.

4. Fold your arms.

5. Sway slowly forward till your head is over your knees, and then back till you feel yourself leaning backward, as in Fig. 43.



Fig. 43.

6. Bend your knees a little.

7. So sway slowly back and forth, keeping the chin always pointing up, till you have rocked backward and forward ten times.

Do this ten times daily the first week, twenty times each day the second week, and thirty times daily after that, and, if you find that this number is not enough, then do as many more as you can with comfort.

In rowing even a mile, one goes through this very rocking exercise from two hundred to four hundred times. So it will at once be seen how actively these muscles have to work in a row of many miles, such as fishermen often take every day.

Questions.

1. Describe the toe-straps, and how to rig them.
2. Describe the exercise to be taken by means of these straps.
3. How should the chin be held ?
4. How many times should you thus rock daily the first week ?
5. How many times each day the second week ?
6. How many after that right along ?
7. In rowing even one mile, how many times will one thus sway back and forth ?
8. Name a class of men who give these muscles a great deal of hard work to do almost every day.

SECTION V.

VARIOUS OTHER EXERCISES FOR THE ABDOMINAL MUSCLES.

1. Just before rising in the morning, lie flat on your back, and, keeping your feet down, raise your head and body slowly till you are sitting up straight. Drop slowly down again, and rise as before. Do this three times each morning the first week, five times each morning the second week, and eight times daily after that. This sets the abdominal muscles hard at work, and makes them strong and useful, *while it also helps make it easier than it used to be either to walk up straight or to run, jump, or row.*

2. Raise your feet up high, and keep your body down.

3. Or run, lifting your knees well, and stepping high, like a spirited horse.

4. Jumping, either along the ground, or over a fence, or other obstacle, is almost violent work for these muscles, and, practised a few minutes daily, would soon make them strong.

5. So would swinging on a rope, bar, or rings, and holding your feet straight out in front of you, or out in front of you in any way.

6. Or any other work that makes you hold one foot or both out in front of you, either for a little time or longer.

7. So would hanging by the toes on a bar or trapeze.

8. Lawn-tennis is fine work for these muscles.

9. Kicking foot-ball is better yet.

10. So is sitting across the parallel bars with the feet under the farther bar, and rocking backward and forward; especially if you let your body drop far down backward over the bar, and then raise it up straight again. But no one should try this who has not already strong abdominal muscles.

11. Mowing with a scythe sets these muscles at work.

12. So does horseback riding.

13. Or going up a rope hand over hand, with your feet out in front of you.

14. Or lying on your back, taking a dumb-bell or other weight across your chest, right under your chin and in front of your neck, and rising with it till you are sitting up straight.

These, and not a few other exercises, some one of which is within the reach of us all, are grand for the abdominal muscles, and will, by-and-by, build them up, adding strength and ease to your walk—indeed, to most of your movements. A person, also, who is strong in these muscles is far less likely to be injured by any sudden and violent effort, as, for example, so many cavalrymen are in war times, by hard horseback riding, or as men unused to riding, when they suddenly take a day in the saddle.

So far we have been looking at work which tended to contract these abdominal muscles. Some of the exercises which tend just the other way—namely, to stretch them out—are of equal value. Let us try one or two.

Questions.

1. Describe the exercise to be taken before rising in the morning.
2. Which muscles does this exercise set at work ?
3. What effect does it have upon them ?
4. What else does it help to do ?
5. Name various other exercises for the abdominal muscles.
6. Which of these is almost violent work for these muscles ?
7. In swinging on a rope, how should the feet be held in order to use these muscles ?
8. What kind of mowing calls these muscles into action ?
9. What kind of riding ?
10. What exercise with the dumb-bells or other weight ?
11. Are persons who are strong in these muscles likely to be injured by sudden and violent effort ?

SECTION VI.

FIRST COUNTER-EXERCISE FOR THE ABDOMINAL MUSCLES.

- Directions.**—1. Stand with the chin up high.
2. Hold the arms akimbo.
3. Breathe slow, deep breaths.
4. Advance the left foot about eight inches in front of the right.
5. Lean the head slowly backward till you get it down as far behind your back as you can.
6. Hold it there till you slowly count five.
7. Then rise up straight again.
8. Repeat this five times.

Why, that was the first exercise in the book—the one for making you straight.

Certainly. And again we see that many of these exercises take hold, not of one muscle only, but of many, and do good to several parts at the same time.

Now tip back in that way five times daily the first week, ten times a day the second week, and twenty times daily after that.

This is good work to help straighten stooping or crooked people, hence should be practised by persons who sit many hours a day, as they are seldom erect, either when standing or sitting.

Questions.

1. What effect have these exercises thus far had on the abdominal muscles?
2. Describe the First Counter-Exercise for the Abdominal Muscles.
3. How should the chin be held?
4. How should you breathe during this exercise?
5. How far backward should you lean the head?
6. How many times should you thus tip backward daily the first week?
7. How many times each day the second week?
8. How many times daily after that?
9. Name a class of persons for whom this is a good exercise.

SECTION VII.

SECOND COUNTER-EXERCISE FOR THE ABDOMINAL MUSCLES.

Directions.—1. Face the wall, standing about fifteen inches from it.

2. Place the hands on the wall right in front of you as high as you can reach, and about two feet apart, with the elbows straight, as in Fig. 44.

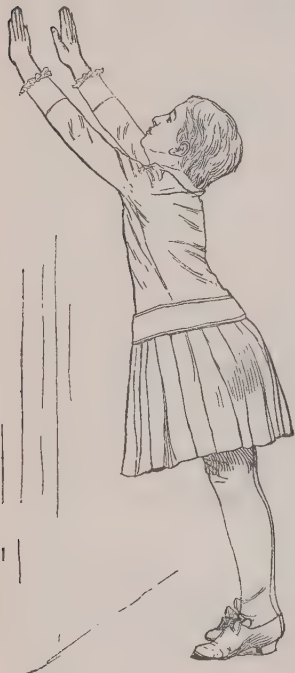


Fig. 44.

3. Now turn the chin upward till you face the ceiling overhead, and keep it so.

4. Breathe slowly a very deep breath, and hold it.

5. Bend your elbows, and let your body go slowly forward till your chest touches the wall, keeping your body and legs stiff and straight all the time.

6. Then push back till you are up straight again.

7. Do not take your heels off the floor, or your eyes off the ceiling right overhead, or your hands off the wall.

8. Do this seven times.

Repeat this pushing seven times daily the first week, twelve times a day the second week, and fifteen times daily after that.

This is even better work than the last to help make people straight, while it expands their chests at the same time. It is also a capital exercise for the home.

Questions.

1. Describe the Second Counter-Exercise for the Abdominal Muscles.
 2. How far should you stand from the wall ?
 3. How should the body and legs be held during this exercise ?
 4. On what should the eyes be fixed ?
 5. How should the heels be held ?
 6. How many times should you thus push daily the first week ?
 7. How many times each day the second week ?
 8. How many times daily after that ?
 9. Name two good results of this kind of work.
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SECTION VIII.

A VARIETY OF COUNTER-EXERCISES FOR THE ABDOMINAL MUSCLES.

The boys and girls in our schools sit from three to five hours a day. After they leave school they will find that they are sitting, as their fathers and mothers do, from six to twelve hours a day, and often even longer yet. Most of them do not sit up straight, but lean over more or less, and thus cramp the abdomen and the vital organs within.

Hence these Counter-Exercises for the Abdominal Muscles are of great value, tending to cure this habit of stooping over, and to keep these muscles where they belong. Here are other exercises which tend in the same way :

1. Chopping wood with an axe.
2. Swinging the blacksmith's sledge, or the ship-carpenter's adze.
3. Putting up dumb-bells.
4. Trying how high you can reach,
5. Or can jump up and reach.
6. Swinging on the rings, or bar, or trapeze.
7. Pulling yourself up on the bar till your chin touches it.
8. Hauling on a rope where you reach your hands upward.
9. About all work on the high parallel bars.
10. Going up a rope or pole hand over hand.

11. Drawing the head and body back in boxing to avoid or to strike a blow.
12. Playing at lawn-tennis.
13. Swinging clubs.
14. Standing with back to the pulley-weights, and raising the handles, first high up overhead, and then pushing them far out in front of you.
15. Lathing, plastering, or painting a ceiling.
16. Swimming.
17. Fencing.
18. Single stick.

Anything, in short, which causes you to draw the head and shoulders backward, and to do it many times, or to hold them so, will stretch and benefit these abdominal muscles.

We are through with the muscles of the arms, also of the neck, back, chest—indeed, of the entire body. We have seen how the arms and body work together, and that if we make almost any part of either strong, it is sure to do the same for some part of the other.

There remain muscles more important than those of our arms—indeed, without which our arms and bodies would be well-nigh useless to us, for we could not move about without being carried—namely, the muscles of the legs.

We shall have exercises for the front of the thigh, the under-thigh, and the calf, or leg below the knee ; and, as with the arm-work, we shall see that many exercises for the legs also help directly to build up some of the muscles of the body.

Questions.

1. How do boys and girls sit for many hours each day ?
2. How does this leaning forward tend to injure them ?
3. What do these Counter-Exercises do for them ?
4. Name a variety of these Counter-Exercises.
5. If we make any part of the body strong by exercise, what is this almost sure to do for some other part ?

REVIEW.

1. When the abdominal muscles are made strong by sensible exercise, what vital organs are benefited ?
2. What disorders will these exercises tend to prevent ?
3. What are some of the uses of these muscles ?
4. When lying down on your back, what do these muscles help you do ?
5. How does ordinary stepping affect them ?
6. What part do they do when you are sitting down ?
7. Name an exercise which sets them hard at work.
8. What kind of abdominal muscles must one have to be able to row fast over a long distance ?
9. If these muscles are small and feeble, what effect have they on a person's walk ?
10. Describe a strong, high step, which will give these muscles much to do.
11. Which tires you more quickly, walking erect, or leaning forward somewhat ?
12. Name a famous walker who always walks up straight.
13. Name the principal points in his walking.
14. Describe the First Exercise for the Abdominal Muscles.
15. What two effects does this raising of the knee have on the abdominal muscles ?
16. How do you do the Second Exercise for the Abdominal Muscles ?
17. Describe the exercise to be taken with the toe-straps.
18. Even in rowing one mile, how many times will a person thus sway back and forth ?
19. Name various other exercises for the abdominal muscles.
20. In swinging on a rope, how should the feet be held in order to use these muscles ?
21. Describe the First Counter-Exercise for the Abdominal Muscles.
22. For what persons is this a good exercise ?
23. How do you do the Second Counter-Exercise for the Abdominal Muscles ?
24. Name two good results of this kind of work.
25. How do boys and girls sit for many hours each day ?
26. How does this leaning forward tend to injure them ?
27. What will be the effect of these Counter-Exercises ?
28. Name a variety of these Counter-Exercises.

PART IX.—THE FRONT OF THE THIGH.

SECTION I.

FIRST FRONT-OF-THE-THIGH EXERCISE.

BEND your knees even the least bit, whether you are standing, walking, running, dancing, skating, vaulting, jumping, lifting, or stooping, and at once the muscles on the front of the thigh are in action. At all times of the day, then, save when you are sitting, lying down, or standing still, they are busy; when you walk slowly or languidly, however, you do not work them hard enough to do them much good, or to give them nearly the size and power which brisk walking would bring to them.



Fig. 45.

- Directions.**—1. Stand with the chin up high.
2. Fold the arms tightly behind you.
3. Place one foot about ten inches in front of the other.
4. Breathe three slow, deep breaths before beginning; then keep on breathing slowly and deeply all the time you are at this work, and for at least a minute afterwards.
5. Now slowly bend the knees till your head is six inches lower than when you were standing up, as in Fig. 45.
6. Then rise till you are straight again.
7. Do this ten times.

So stoop and rise ten times each day the

first week, fifteen times daily the second week, and twenty-five times a day after that right along.

Do not let your heels touch the floor during any part of this exercise, nor lift the feet wholly off the floor. You will soon find that this is setting the front of each thigh at work.

Questions.

1. Name many movements which at once set the muscles on the front of the thigh in action ?
 2. Which makes those muscles stronger, slow or brisk walking ?
 3. Describe the First Front-of-the-thigh Exercise.
 4. How many breaths, and of what kind, should first be taken ?
 5. How should the knees be bent in this exercise ?
 6. How many times should you thus stoop and rise daily each week ?
 7. How should the heels be held ?
 8. What parts will this exercise be found to call into action ?
-

SECTION II.

SECOND FRONT-OF-THE-THIGH EXERCISE.

Directions.—1. Stand with the chin up high.

2. Hold your shoulders far back and low down, and your elbows and hands as in Fig. 46.

3. Breathe three slow, deep breaths before beginning, as in the last exercise, placing your left foot about fifteen inches forward of your right.

4. Do not let your heels touch the floor at all.

5. Bending your knees slowly, and stooping only a little, now spring smartly upward, and at the same time bring your left foot backward and your right foot forward, landing with each foot on your toes and soles only, as in Fig. 46.

6. Then spring back again till your left foot is forward and your right backward, as at the start.

7. Repeat this six times.

Do it six times daily the first week, ten times daily the

second week, and fifteen times each day after that right along.



Fig. 46.

This will not only soon bring strength and size to the front of the thigh, but it is excellent to make one springy and light of foot, while it helps strengthen the muscles at the sides of the waist and the abdominal muscles, and so to bring a firmer and more erect carriage of the body. Also, should you chance at any time to fall from a height, or to spring suddenly out of a carriage, the getting these springing muscles strong and well-knit, and used to vigorous work, makes you far less liable to injury.

Questions.

1. Describe the Second Front-of-the-thigh Exercise.
2. How should the feet be held in this exercise?
3. How often should the heels touch the floor?
4. How many times should you thus spring daily each week?
5. To what part does this work bring strength and size?
6. Does it tend to make one light-footed or clumsy?
7. What muscles of the body does it help to strengthen?
8. What effect has it on the carriage of the body?
9. If you have made these front muscles of the thigh large and strong, how will a fall from a high place be likely to affect you?

SECTION III.

THIRD FRONT-OF-THE-THIGH EXERCISE.

Directions.—1. Stand with the chin up high.

2. Put one hand on the desk or wall to steady yourself.

3. Breathing slowly and deeply, hold your left foot out in front of you a few inches above the floor, and gradually bend your right knee and lower till you are half-way to the floor, as in Fig. 47; for if you go all the way down it will be too hard for many of you at first.

4. Then rise slowly till you are up straight again.

5. This time extend your right foot in front of you, and gradually bend the left knee, settling down till you are half-way to the floor.

6. Then rise again.

7. Do this three times.

Do this three times on each

foot daily the first week, five times each day the second week, and seven times daily after that right along. Do it as many more times, mornings and evenings, as you can with ease.



Fig. 47.

If you find that you can do it more times on one foot than on the other, confine your home-work to the foot on which you are poorest at it, until you can do as many with that foot as with the other, which will likely be in a very few weeks.

Questions.

1. Describe the Third Front-of-the-thigh Exercise.
 2. How should the chin be held always in this exercise ?
 3. How should you breathe ?
 4. How high off the floor should the foot which is held in front be in this exercise ?
 5. How low down should you stoop ?
 6. Why not stoop as low as you can ?
 7. How should you rise again, slowly or rapidly ?
 8. How many times daily should this be done each week ?
 9. How many times daily at home ?
 10. If you find that you can do this exercise more times with one foot than with the other, what should you do ?
-

SECTION IV.

FOURTH FRONT-OF-THE-THIGH EXERCISE.

Directions.—1. Stand with the chin up high, the heels together, and the toes turned outward.

2. Breathing deeply and slowly, bend your knees, and stoop till you are nearly half-way to the floor ; then spring straight upward, till your feet are off the floor six inches or more.

3. Never, in any part of this exercise, touch the floor with your heels, but start on your toes, bend on your toes, spring on your toes, and land on your toes. Landing on your heels is clumsy and noisy.

4. Both spring and land as lightly and quietly as you can. Persons with strong and fine legs are seldom noisy on their feet.

5. Repeat this four times.

Practise this exercise four times daily the first week, six times each day the second week, and ten times daily after that.

This will do for the Front-of-the-thigh Exercises, unless there is a spring-board in the school. If so, then you have a grand aid to making First, Second, and Third Exercises far easier than when done on the firm floor, for the spring of the board makes them very pleasant. There is no way in which you can spring from the floor, ground, or spring-board—indeed, from anything on which you can stand—which does not help build up the front of your thighs.

Questions.

1. Describe the Fourth Front-of-the-thigh Exercise.
 2. How should you stand in this exercise ?
 3. How should you breathe ?
 4. In what part of this exercise should your heels touch the floor ?
 5. How should you both spring and land ?
 6. How many times daily should this exercise be practised each week ?
 7. What piece of apparatus is a great aid to the First, Second, and Third Front-of-the-thigh Exercises ?
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SECTION V.

FIFTH FRONT-OF-THE-THIGH EXERCISE, OR RUNNING.

Directions.—In running (which is an exercise for out-doors, rather than the school-room),

1. Always hold the chin up above the level.
2. Never touch either heel to the ground.
3. Keep your hands shut and your elbows bent till your hands are about level with your waist ; then swing your arms easily, not stiffly, at your sides.
4. As much as you can, breathe through the nose only, and make each breath as slow, deep, and full as possible.
5. Step far out forward, but do not throw the foot up high

behind. Myers, the fastest half-mile runner in America, steps seven feet four inches at each stride.

6. In running for exercise, and to develop the legs and lungs, do not run as fast as you can, but a little slower than that; for you will find that by doing so you will not tire so quickly, and will get the good of running, yet avoid its risks.

7. At first run slowly and only as far as you can with comfort, even though it is not over a hundred yards. For, remember that the object of these exercises is not to make racers and enable pupils to parade, but to make them strong, vigorous, and well-built, so that they are likely to become healthy and useful men and women.

Each day the first week run as far as you did the first day. The next week try to run twice as far each day, and after that run daily as far as you can with comfort.

Never run fast within half an hour after a meal. Perhaps as good a time as any for running is about an hour or an hour and a half before eating. If you run or exercise in any other way till you perspire, you should at once, after exercising, rub the skin briskly with a coarse towel, and then put on a dry under-shirt. This will keep you from taking cold.

Questions.

1. How should the chin be held in running?
2. What part of the foot should not touch the ground in this exercise?
3. How should the hands and arms be held?
4. How should you breathe?
5. How far forward should you step?
6. Should the foot be thrown far backward?
7. How fast should you run?
8. How far should you run daily each week?
9. When should you not run?
10. When is a good time to run?
11. If you run or exercise in any other way till you perspire, what should you do to avoid taking cold?

SECTION VI.

VARIETY OF EXERCISES FOR THE FRONT OF THE THIGH.

After you have practised the above five exercises for a month in the way pointed out, if you have a spring-board, just get on it and dance, or spring, or turn about any way you like, either on one foot or on both feet, so long as you bend your knees and do not touch your heels. Keep at this as long each day as you can with comfort, springing always as lightly and quietly as possible, and you will soon be astonished at the effect it has on your thighs, even though you do not spring or dance more than five minutes a day. Indeed, if you keep at it steadily and vigorously, by the third month you will find you can go almost twice as high at each spring as you did when you began, yet with no more effort.

Among other exercises for the front of the thigh are the following :

1. Strong, vigorous walking every day, till you are just beginning to get tired, the chin always held up above the level, is capital for the front of the thighs.
2. Slow, easy running for a long distance, is better yet for these great muscles of the thighs, or brisk running for a short distance, though this will not bring the size and power of thigh which long-distance running will.
3. Walking or running up-stairs or up-hill.
4. Running down-stairs on your toes.
5. Skating, either fast or far.
6. Vaulting.
7. Jumping—upward or downward.
8. Leaping—forward, backward, or sideways.
9. Dancing.
10. Riding on a bicycle or a velocipede.
11. Hopping.
12. Riding horseback.
13. Playing lawn-tennis.

14. Lifting weights from the floor or ground.
15. Walking with a sack of grain, salt, or shot, or a boy, or other heavy weight on your back.
16. Walking on a treadmill, as Rowell, the noted pedestrian, is said to have done to help build up his great thighs, so that he could so often win the terrible six-day "go-as-you-please" races.
17. Rowing, especially where your seat slides back and forth, and you push hard with your feet.
18. Pulling in the tug-of-war.
19. Any kind of wrestling.

One thing should be kept in mind—namely, that a walk now and then, at an easy pace and not very far, does but little for the legs. To have walking make the thighs larger and stronger you must, first, walk briskly; second, walk a good distance; third, walk every day, or as nearly every day as you can. *It is this brisk and steady, though not violent, work, and plenty of it, which pays when you wish to bring your muscles into action, whether of the thighs, arms, back, or any part, not the now-and-then, aimless, languid kind.*

Questions.

1. How can you use the spring-board so as to aid greatly in making the front of the thighs larger and stronger?
2. How long each day should you use the spring-board?
3. What result may you expect by the third month, if you have worked thus steadily and vigorously?
4. Name a variety of other exercises for the front of the thigh.
5. What kind of walking is good for the front of the thighs?
6. How long should such walking be kept up?
7. How should the chin be held in this walking?
8. What kind of running is good for the front of the thighs?
9. What kind of jumping?
10. What kind of riding?
11. Does occasional and easy walking do the legs much good?
12. Name three things you must do in walking in order to make the thighs larger and stronger.
13. What kind of work is best for any of the muscles?

REVIEW.

1. Mention different exercises which at once set the muscles on the front of the thigh in action.
2. Which makes these muscles stronger, languid and easy walking, or vigorous and rapid walking ?
3. Describe the First Upper-thigh Exercise.
4. How do you do the Second Upper-thigh Exercise ?
5. To what parts does this work bring strength and size ?
6. Does it tend to make one light-footed or clumsy ?
7. What muscles on the body does it tend to strengthen ?
8. What effect has it on the carriage of the body ?
9. How do you do the Third Front-of-the-thigh Exercise ?
10. How do you do the Fourth Front-of-the-Thigh Exercise ?
11. In what part of this exercise should the heels touch the floor ?
12. If you land on your heels, what will the effect be ?
13. How should you both spring and land ?
14. How should you hold the chin in running ?
15. How should the hands and arms be held ?
16. What part of the foot should not touch the ground in running ?
17. How should you breathe ?
18. How far forward should you step ?
19. Should the foot be thrown far backward ?
20. If you run or exercise in any other way till you perspire, what should you do to avoid taking cold ?
21. How fast should you run ?
22. How far should you run daily each week ?
23. When should you not run ?
24. When is a good time to run ?
25. Name a variety of other exercises for the front of the thighs.
26. How can you use the spring-board so as to aid in making the front of the thighs larger and stronger ?
27. What kind of walking does little for the front of the thighs ?
28. And what kind of wrestling ?
29. What kind of rowing ?
30. Name three things you must do in walking in order to make the thighs larger and stronger.
31. What kind of work is best for any of the muscles ?

PART X.—THE UNDER SIDE OF THE THIGH.

SECTION I.

FIRST UNDER-SIDE-OF-THE-THIGH EXERCISE.

PERSONS who never walk with their knees straight, but always somewhat bent—and there are more such, even among boys and girls, than many think—are almost sure to be weak and small in the muscle of the under or back part of the thigh; while they who walk always erect, with the knees well-knit, and sprung somewhat backward, are very apt to have good-sized and well-shaped muscles on the under-thighs, and a fullness instead of thinness on this part of the legs.

The work of this under-thigh muscle is not unlike that of the biceps of the arm—indeed, biceps is part of the Latin name of it. The biceps bends the arm at the elbow, and helps draw the hand up towards the body. So the muscle of the under-thigh helps to bend the knee, and to draw the heel up towards the body. If one had any work which caused him to lift his heels up much behind him, such as tying a weight to the ankle and then lifting it up backward many times, he would find that if any muscle ached next morning from over-work it would be this one of the under-thigh.

Let us, then, try one or two kinds of work for this muscle.

Directions.—1. Stand about three feet apart in a row about a foot from the side-wall of the room, and with your back towards the side-wall.

2. Hold your arms behind you, and your chin up.

3. Place the right heel against the wall, about three inches above the floor.

4. Push with the right heel hard against the wall, as in Fig. 48, until you slowly count ten.

5. Then set your right foot on the floor, and put your left heel against the wall.

6. Push in the same way with it till you slowly count ten.

7. Do the same again with your right heel, and so on, turn about, till you have pushed five times with each foot.

So push five times daily the first week, ten such daily the second week without stopping, and fifteen daily after that.

Questions.

1. What persons are almost sure to be weak in the under muscles of the thighs ?
2. What persons are likely to have these muscles good-sized and well-shaped ?
3. What part of the arm does this under-thigh work resemble ?
4. What does the biceps muscle do to the arm ?
5. What muscles bend the knee ?
6. What kind of work takes hold directly of these muscles ?
7. Describe the First Under-side-of-the-thigh Exercise.
8. How near the wall should the back be held in this exercise ?
9. How should the right heel be held ?
10. How high above the floor ?
11. How long should you so push with each foot ?
12. How many times should you so push daily with each foot the first week ?
13. How many each day the second week ?
14. How many daily after that ?



Fig. 48.

SECTION II.

SECOND UNDER-SIDE-OF-THE-THIGH EXERCISE.

Directions.—1. Stand in the aisle, with chin high, and the hands as high overhead as you can.

2. Take a deep breath.



Fig. 49.

3. Hold the knees stiff and straight all the time.

4. Now bring your hands over down in front of you, keeping the elbows also straight, until you touch the floor with your fingers, or go as low as you can, as in Fig. 49.

5. Rise up straight again, and rest a moment.

6. Now, without bending the knees, and with straight elbows, again touch the floor with your fingers, or go as low as you can, and again rise.

7. Repeat this three times.

Do this three times daily the first week, five times each day the second week, and eight times daily after that.

If you bend your knees at all you will get little good from this exercise. They should be held rigidly straight. Take care also to keep the elbows straight.

This exercise will not only help give you good under-thighs, but *will also aid much in making you walk up straight, with a firm step, instead of a weak one.* Some persons can touch nearly the whole hands to the floor in this way without bending their knees.

Questions.

1. Describe the Second Under-side-of-the-thigh Exercise.
 2. How should the knees be kept during this exercise ?
 3. How the elbows ?
 4. How low down should you reach with your fingers in this exercise ?
 5. How many times a day should it be done during the first week ?
 6. How many times daily the second week ?
 7. How many times each day after that ?
 8. Besides helping to give you good under-thighs, how else will this exercise do you good ?
-

SECTION III.

THIRD UNDER-SIDE-OF-THE-THIGH EXERCISE.

Directions.—1. With a strap or towel, tie a dumb-bell to the back of your right ankle.

2. Stand with arms folded behind you.

3. Hold the chin up high.

4. Breathe slowly and deeply.

5. Now slowly raise your right heel behind you till it is as high as your left knee, as in Fig. 50.

6. Then slowly lower your right foot to the floor.

So raise the dumb-bell behind you with your right foot five

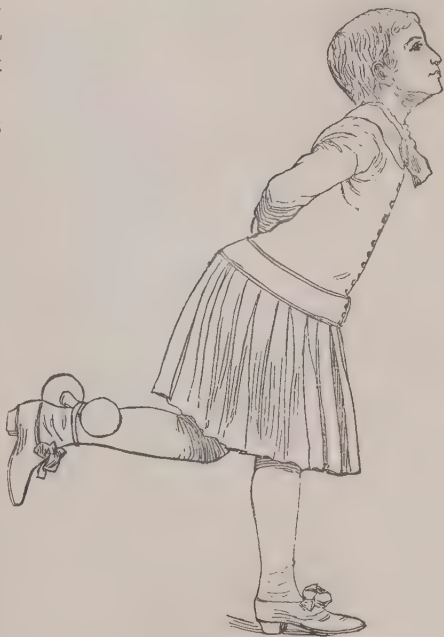


Fig. 50.

times. Then fasten the dumb-bell to your left foot, and raise it slowly five times in the same way. Breathe deeply and slowly all the time.

Lift the dumb-bell in this way five times with each foot daily the first week, eight times daily with each foot the second week, and as many each day after that as you can with ease.

Many other exercises for the under part of the thigh may be given. Such are—

1. Walking up-hill.
2. Running slowly up-hill.
3. Running on level ground, but throwing the heel high up behind at each step, as in Fig. 51.
4. Running backward.



Fig. 51.

5. Hopping on one foot, and carrying a dumb-bell or other weight held up behind you on the other.
6. Putting your foot in the handle of a shoulder-weight, and pulling it downward many times.
7. Or strapping your foot to the handle of the rowing-weight, and drawing it out backward many times.
8. Hanging by the heels on the rung of a ladder, on a trapeze, or on a rope.
9. Jumping frequently over any object nearly or quite as high as you can clear.

10. Hurdle-racing on foot.
11. Jumping directly upward, as high as you can, in trying to see how high you can touch with your hand, as to catch a bar or the branch of a tree.
12. In short, any exercise which makes you either draw one or both heels up vigorously and often, or keeps them up, gives these muscles of the under-thighs good work to do, and, steadily practised, will, ere many months, go far towards making the under-thighs strong, of good size, and well-shaped.

Questions.

1. Describe the Third Under-side-of-the-thigh Exercise.
2. How high should the heel, with the dumb-bell on it, be raised in this exercise ?
3. Should the foot be raised and lowered slowly or quickly in this work ?
4. How many times daily the first week should this exercise be done with each foot ?
5. How many times each day the second week ?
6. How many times each day after that ?
7. Name various other exercises which all help make the under-thighs strong and of good size and shape.
8. How should the dumb-bell be held when you hop in one of these exercises ?
9. What kinds of jumping develops this muscle ?

PART XI.—THE LEG BELOW THE KNEE.

SECTION I.

WORK FOR THE LEG BELOW THE KNEE.

THE muscles of the calf of the leg raise the heel. You can scarcely take a step without using them somewhat. But where you walk in such a way as to lift your heel but little at each step, you not only acquire an awkward step and gait, but, if not stopped, will tend, by-and-by, to make the calves thin and weak, if they are not so already, and the foot flat as well. On the other hand, whoever, in walking, always raises the heel high before the sole and toes of the foot leave the ground, and pushes hard with the sole and toes as the foot leaves the ground, is helping to make the calves large and strong, and well-shaped besides.

Of two brothers—growing boys—well known to the writer, the older one did not use his toes and soles very much in walking; but the other, whether standing, walking, or running, was always on his toes, till it seemed almost as if he could not put his heels down if he wanted to. Well, the first had fair calves and rather thin thighs; but the other had beautiful calves, round, full, and remarkably well-shaped, much finer than any other boy of his age in the neighborhood. And he always carried his knees sprung well back, and was very graceful on his feet and in nearly all his movements.

Questions.

1. What muscles raise the heel ?
2. If you raise your heels only a little when you walk, what effect will it have on your walk ?
3. How will it tend to affect the legs ?
4. What does raising the heels high and pushing hard with the toes and soles in walking do for the calves ?
5. Describe the difference between the ways of walking of the two brothers mentioned above.
6. Which had the stronger and more shapely leg ?
7. Which was the more graceful on his feet, and in nearly all his movements ?

SECTION II.

FIRST BELOW-THE-KNEE EXERCISE.

Directions.—1. Stand with chin up high, heels together, toes turned out, and arms folded.

2. Breathe several deep, full breaths, till your chest is filled out in every corner, as large as you can swell it, and keep on breathing so throughout the exercise.

3. Now rise slowly on your toes, till your heels are as high off the floor as you can get them without lifting your toes, as in Fig. 52.

4. Then lower your heels slowly, till they are on the floor again.

5. Repeat this fifteen times.

So rise fifteen times a day the first week, twenty-five times daily the second week, and as many times each day after that as you can comfortably.

It will not be strange if a few minutes of

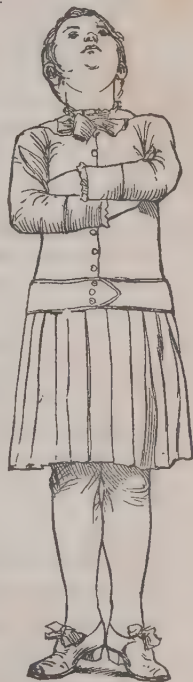


Fig. 52.

this exercise each day will, in a few months, and often in less time, increase the girth of each calf all of an inch, especially if the person was not much used before to active work on the soles and toes.

Daily active use of these muscles goes far towards giving one a springy, elastic step, and helps to make walking an easy and pleasant matter. This is also a capital morning and evening exercise in one's room.

Questions.

1. Describe the First Below-the-knee Exercise.
2. How should the feet be held in this exercise ?
3. How should the chin be held ?
4. How should you breathe ?
5. How high should you raise your heels ?
6. Slowly or quickly ?
7. Should the toes come off the floor ?
8. How many times should this be done daily each week ?
9. How much gain in the girth of the calf may often be had in a few months by practising this exercise even a few minutes each day ?
10. What effect will daily active use of these muscles of the calves have on the step ?

SECTION III.

SECOND BELOW-THE-KNEE EXERCISE.

Directions.—1. Stand erect.

2. Breathe deep, full breaths, both before and in the exercise.

3. Raising the right foot, hop *straight upward* with the left foot, never touching the left heel to the floor, either when you spring or when you land, as in Fig. 52.

4. Then raise the left foot, and hop once in the same way with your right foot.

5. Repeat this ten times.

Hop in this way ten times on each foot daily during the first week, fifteen times a day the second week, and twenty-five times daily after that.

This work will not only rapidly strengthen and fill out the muscles of the calves, but those of the front of the thighs as well, while it also calls those of the sides and front of the waist into active play.

Questions.

1. Describe the Second Below-the-knee Exercise.
 2. How should the chin be held ?
 3. How should the breathing be in this as compared with the last exercise ?
 4. In what direction should you hop in this exercise ?
 5. How often should the hopping heel touch the floor ?
 6. How many such hops should you take daily each week ?
 7. State what parts this work will rapidly strengthen and enlarge.
-

SECTION IV.

THIRD BELOW-THE-KNEE EXERCISE.

Directions.—1. Stand erect.

2. Hold the chin up high.
3. Breathe large, deep breaths.
4. Raise the left foot off the floor, and hold it about half as high as the right knee.
5. Now raise the right heel slowly as high as you can, without taking the toes of the right foot off the floor.
6. Stand thus on your right toes and the sole of your right foot (as in Fig. 53) till you count five.
7. Then slowly lower your right heel till it is on the floor.
8. So raise and lower your right heel again three times. Then change to the left foot, and raise and lower the left heel in the same way three times, keeping the right foot wholly off the floor.



Fig. 53.

Do this three times, on each foot, daily the first week, five times each day the second week, and eight times a day after that right along.

A very little of this work every day during the first month—with most persons less than a minute at it—will prove quite as hard as they will want. But it is admirable for the muscles below the knee, throwing the whole weight, as it does, first on the calf of one leg, then of the other. Hence it is especially useful in bringing up one leg which is weak so that, below the knee, it shall be equal in size to the other. For many boys and men—indeed, most of them—when kicking foot-ball,

or doing any other work where only one foot is used, work mostly with the right foot, *and so make the right leg the larger and stronger.*

This raising, then, on the left foot many times each day would be just what such persons need to make the left leg as large and strong as the right.

Questions.

1. Describe the Third Below-the-knee Exercise.
2. How high should the left foot be held in this exercise while you are standing on your right foot?
3. How high should you raise the right heel while standing on the right foot?

4. Should you raise and lower the heel quickly or slowly ?
 5. How many times should this be done daily each week ?
 6. How long a time each day at this work will prove quite enough for most persons ?
 7. What part does this exercise greatly benefit ?
 8. Why does it so benefit the calves ?
 9. Are most persons right-footed as well as right-handed ?
 10. What effect has this greater use of the right foot generally on the size of the right leg ?
 11. What should be done, then, in case one leg measures more below the knee than the other ?
-

SECTION V.

FOURTH BELOW-THE-KNEE EXERCISE.

Directions.—1. Stand in the aisle, with arms akimbo and chin up high.

2. Breathe deeply and slowly.
3. Hold the left foot half as high as the right knee.
4. Hop forward on the right foot to the head of the aisle, turn, and hop down the next aisle ; then back up the first one till you reach the starting-point.
5. Rest a moment till you get your breath.
6. Then hop over the same distance again, only this time on the left foot.

Hop this distance on each foot daily the first week, twice over the same distance on each foot daily the second week, and three times over it daily after that.

If you have small and feeble calves, you may find that you cannot at first hop so far as once around two aisles in the way just shown. In that case, hop as far with the right foot as you can with comfort, and then stop. Then go only that same distance with the left. The second week you will find that it will come easier, hence you can increase the distance ; and so

after that, whatever you can take with comfort, for *it never pays to overdo*.

After the first month at these exercises, we can try one or two harder ones. We will have only two more in-door exercises for the calves, which, though simple, are sure to tell even more vigorously on these same useful muscles.

Questions.

1. Describe the Fourth Below-the-knee Exercise.
 2. How should the chin and arms be held in this exercise?
 3. How should you breathe?
 4. How high should the left knee be held while the right foot is hopping?
 5. How far will be a good distance to hop daily on each foot during the first week?
 6. How far the second week?
 7. How far daily after that right along?
 8. If too feeble below the knee to hop once around two aisles at first, how far should you go on each foot?
 9. How far after that?
-

SECTION VI.

FIFTH BELOW-THE-KNEE EXERCISE.

Directions.—1. Stand with a dumb-bell in each hand, and the chin up.

2. Breathe slowly and deeply.
3. Holding the dumb-bells about as high as your elbows, swing them gently back and forth a little past your sides, quite near to you, as in Fig. 54.
4. At the same time walk slowly forward.
5. Only be careful to *push as hard as you can with the toes and sole of each foot just as it leaves the floor*. This hard pushing does much to make the calves full and shapely, and is ex-

cellent also both for the under-thigh and for springing the knees back into a good position.

6. Walk in this way up the aisle, down the next aisle, and back to the point of starting.

Go this far daily the first week, twice as far each day the second week, and three times as far daily the third week right along.

This is also a capital home exercise. A few minutes at it each day will do much for your calves, and your lungs, chest, biceps, and the front of your shoulder will all share in the good work. If you can take this exercise out of doors, all the better.



Fig. 54.

Questions.

1. Describe the Fifth Below-the-knee Exercise.
2. How should the chin be kept ?
3. How should you breathe during this work ?
4. How high should the dumb-bells be held in this exercise ?
5. How should they be swung ?
6. How fast should you walk in this exercise ?
7. How should you use your feet in this work ?
8. What does this hard pushing with soles and toes do to the calves ?
9. What other good does it do besides enlarging and strengthening the calves ?
10. In what part of this work should the heel touch the floor ?
11. How hard should you push with each foot ?
12. In what part of the step ?
13. How far should you thus walk daily each week ?
14. What other parts share in this exercise ?

SECTION VII.

SIXTH BELOW-THE-KNEE EXERCISE.

Directions.—1. Stand erect in the aisle, with arms akimbo, and the chin as high as you can hold it.

2. Now, keeping the knees sprung far back, and never once bending them, spring about an inch off the floor.

3. At no time in this exercise should either heel touch the floor, but the springing should be done entirely with the soles and toes.

4. Repeat this three times.

Spring in this way three times daily the first week, six times daily the second week, twelve times each day the third week, and as many times a day after that as you can with comfort. Even one minute at this work each morning and evening at home after the third week will do much towards making the calves large and well-shaped.

The main thing in this exercise is to keep the legs rigidly straight. *But this makes it grand work for the calves, almost the best known to quickly make them large and strong.* This exercise should not be tried by most pupils until after a month has been given to the preceding ones.

Questions.

1. Describe the Sixth Below-the-knee Exercise.
2. Where should you stand during this exercise ?
3. How high should the chin be held ?
4. How should the knees be held all the time in this work ?
5. How high should you spring from the floor ?
6. What parts of the foot should do all the springing ?
7. How many times daily should you thus spring each week ?
8. What will be the effect of even one minute at this work at home, each morning and evening ?
9. What is the main thing to do in this exercise ?
10. How long a time should the other Below-the-knee Exercises be practised before trying this one ?

SECTION VIII.

A VARIETY OF BELOW-THE-KNEE WORK.

There are many other exercises which are capital for the calves, giving them strength and size, and adding much to the grace and ease of movement of their owner. A light and springy dancer is almost sure to have good calves, and a strong and often well-shaped instep as well. So is a good jumper.* For all this rising on the toes and soles, and hopping and springing about, tells not only on the calves, but on both the bones and muscles of the foot as well, making them stronger, better-shaped, and fitter for their work.

Try a few exercises out of doors at your leisure for these same muscles of the calves, such as

1. Walking on level ground, but pushing hard with the soles and toes as your foot leaves the ground.
2. Walking in the same way up-hill.
3. Running on the soles and toes, as in Fig. 55.
4. Hopping on one foot, at first but a short distance, but, after the second month, perhaps two hundred yards or more. This does not rest you as running does, because in it one foot is at work all the time, while, in running, each foot keeps getting brief rests.
5. Every kind of jumping, as in Fig. 56.
6. Almost every exercise you can do on a spring-board.
7. Horseback riding, with only the toes or soles on the stirrups.

* Notice the statues and full-length portraits of Washington, for instance, and see what strong and shapely calves he had. Not only a man of marvellous physical power in other respects, the kind of jumper he was may be gathered from the fact that although the best long-distance running jump by an amateur in the United States in 1876 was only 17 feet 4 inches, by Mr. Fraser, of the Yonkers Lyceum, and as late as 1881 the best record was only 22 feet, $4\frac{7}{10}$ inches, by Mr. Voorhees, of the Manhattan Athletic Club, yet tradition says that Washington cleared 23 feet.

8. Rowing, especially where you use a sliding seat, and so push the feet hard against the foot-board.
9. Walking up-hill, but bending the knees as little as you can.
10. Walking only on the soles and toes.
11. Running down many stairs without touching your heels (the only way one should run down-stairs).
12. Walking on stilts, when you only put your toes and soles on the foot-blocks.
13. Vaulting over bar, vaulting-horse, or any other object.
14. Lawn-tennis,
15. Skating, and
16. Riding on bicycle or velocipede, where you push the pedal, not with the heel or hollow of the foot, but with the toes and soles only.



Fig. 55.



Fig. 56.

These are among the exercises sure to tell rapidly and favorably on the muscles of the calves, if only steadily and vigorously followed up.

After the first month at this work, hopping races between five or six pupils at a time, at first for say a hundred yards, and afterwards two or three times as far, will soon, if kept up daily, even for a few weeks, make the calves shapely, full, and strong, and will improve the walk as well.

Questions.

1. Mention a variety of below-the-knee work.
2. What does this work do ?
3. What persons are almost sure to have good calves ?
4. Name an illustrious American patriot who was an excellent instance of this.
5. How far is Washington reported to have leaped at a single bound ?
6. How does this record compare with any other by an amateur in the United States up to 1882 ?
7. Besides making the legs below the knee of good strength, of good shape, and of good size, what other part is greatly helped by much hopping and springing about ?
8. To get the greatest benefit to the legs below the knees, what parts of the feet in horseback riding should be in the stirrups ?
9. What part should do the pushing in bicycle or in velocipede riding ?
10. What kind of racing after the first month will help to soon make the calves shapely, full, and strong ?
11. What effect will such racing have on the walk also ?

PART XII.—THE SHIN MUSCLE.

SECTION I.

FIRST SHIN-MUSCLE EXERCISE.

CLOSE by the shin-bone on the front of the leg is a little, but important, muscle, which for brevity we will call the “shin muscle.” If you walk as fast as you can until you are tired, this muscle will be likely to ache next morning. Small as it is, if it is not fairly developed, it takes away much from the looks of the limb. No one can be an enduring rower without having it strong; and it is actively at work in all kinds of running, and very actively in kicking foot-ball.

We will have but one or two exercises for it.

Directions. — 1. Stand with arms folded behind you, and chin up.

2. Reaching the right foot a little in front of you, and lifting it about a foot from the floor, holding the right knee straight, draw the toes of the right foot in over the right instep and up towards the right leg as far as possible, as in Fig. 57.

3. Hold it so drawn up a moment.

4. Then push the right toes downward and outward as far as possible, keeping the right knee always straight and stiff. You will feel in a moment that you are setting this little muscle actively at work.

5. Now stand on the right foot, and practise the same exercise with the left foot.

6. Repeat this five times.



Fig. 57.

Do this five times daily the first week with each foot, ten times daily the second week, and fifteen times each day after that.

Questions.

1. Where is the muscle which we call the shin muscle ?
2. Why is it an important muscle ?
3. What kind of exercise sets this muscle at work ?
4. Explain the First Shin-muscle Exercise.
5. How should the right knee be held throughout this exercise ?
6. How far up should the toes of the right foot be drawn in front ?
7. How far should they be extended outward and downward ?
8. How many times daily should this exercise be practised each week ?

SECTION II.

SECOND SHIN-MUSCLE EXERCISE.

Directions.—1. Hold your chin up and your arms behind you.
2. Stand on the left foot, and lay one dumb-bell across the top of the right foot, as in Fig. 58.



Fig. 58.

3. Holding the right knee stiff, slowly sway the right foot far out sideways to the right, and slowly the other way far out to the left.

4. Take care not to let the dumb-bell fall off.

5. If you can not hold it on securely in this way, it may be strapped on. After a little time you will be able to keep it on without strapping.

6. Then change the dumb-bell to the left foot, and go through a like exercise with that.

7. Repeat this four times.

Do this four times daily with each foot during the first week, eight times each day the second week, and ten times daily after that.

The effort to retain the dumb-bell on the top of the foot will give this useful little muscle all it wants to do, and will soon make it larger and stronger, and add to its owner's skill and endurance as a walker, runner, or dancer.

A great variety of other exercises, familiar to boys and acrobats, will furnish good work for this little muscle.

1. Any kind of swimming keeps these muscles vigorously at work.
2. So does rowing.
3. Swaying back and forth with the feet in the foot-straps, as described in the Toe-strap Exercise, page 120.
4. Hopping on one foot with a dumb-bell held on the front of the other.
5. Jumping of any sort, especially upward.
6. Leaping.
7. Kicking foot-ball.
8. Hanging by the toes on the horizontal bar or trapeze.
9. Swinging by the toes on the rings.
10. Standing on one foot and reaching the other as high up as possible on a side wall.
11. Fast walking, also, will soon make these little muscles ache, as all who ever walked in a race have found out.
12. So will stooping down as low as you can, if you do not take your heels off the floor.
13. Dancing also sets these muscles at work ; indeed, no person can be a really fine dancer until these little muscles are thoroughly trained and strong.

Try any of these, even for a few minutes, and you will soon find what kind of shin muscles you have, and what to do for them if they are small or weak.

Questions.

1. Describe the Second Shin-muscle Exercise.
2. How far should the upper foot be swung each way in this exercise ?
3. What special care should be taken ?
4. How many times daily should this be practised the first week with each foot ?
5. How many times daily the second week ?
6. How many times each day after that ?
7. What will be the effect on the shin muscles ?
8. In what other exercises will it aid the person who is practising it ?

REVIEW.

1. What persons are almost sure to be weak in the muscles on the under-side of the thighs ?
2. What persons are likely to have these muscles good-sized and well-shaped ?
3. This under-thigh work resembles the work of what part of the arms ?
4. What does the biceps muscle do to the arm ?
5. What muscles bend the knee ?
6. What kind of work takes hold directly of these muscles ?
7. Describe the First Under-side-of-the-thigh Exercise.
8. How do you do the Second Under-side-of-the-thigh Exercise ?
9. In what two ways does this exercise benefit you ?
10. Describe the Third Under-side-of-the-thigh Exercise.
11. Name various other exercises which help make the under-side of the thighs large, strong, and well-shaped.
12. How should you raise your heels in walking ?
13. Describe the different ways of walking of the two brothers referred to in the lesson.
14. Describe the First Below-the-knee Exercise.
15. What is the effect of the daily active use of these muscles ?
16. How do you do the Second Below-the-knee Exercise ?
17. What parts does this work strengthen and enlarge ?
18. Describe the Third Below-the-knee Exercise.
19. What parts does this exercise greatly benefit ?
20. How do you do the Fourth Below-the-knee Exercise ?
21. Describe the Fifth Below-the-knee Exercise.
22. What is the effect of this exercise ?
23. How do you do the Sixth Below-the-knee Exercise ?
24. What is the principal thing to do in this exercise ?
25. Name a variety of below-the-knee exercises.
26. What does this work do ?
27. To get the greatest benefit to the leg below the knee, what parts of the feet in horseback riding should be in the stirrups ?
28. What parts should do the pushing in bicycle or velocipede riding ?
29. Where does the muscle which we call the "shin muscle" lie ?
30. Describe the First Shin-muscle Exercise.
31. How do you do the Second Shin-muscle Exercise ?
32. Name a variety of exercises for the shin muscles.

APPENDIX.

IN the first seven of the following tables the pupil will see what a rapid and gratifying increase was made through exercise by many youths in the various girths of the trunk and limbs, and in a few months' time. Boys and girls have a great advantage in that their bones are still plastic, and their chests can be expanded and their muscles developed more easily than can those of persons in later life.

In Table VIII. the boy, and in Table IX. the girl, can record their height, weight, and various measurements at the time they begin these exercises, and one year later can again enter the figures which they then find to be correct. Thus at any time they can tell at a glance how much they have gained in size, how their arms compare in girth, and how nearly they are in size like others of their own height and age.

This index will prove useful and interesting also in later years. Entries should be made on the same date each year, showing the annual progress in this important field of physical development. And in after-life it will often prove the only true record of one's size and physical proportions, and one that the owner would not willingly part with.

Care should be taken to measure the fore-arm, upper-arm, etc., at the largest place each time, so that the measurements shall be uniform.

TABLE I.

Showing the average state of the development of 200 men upon entering the Bowdoin College Gymnasium, from the classes of '73, '74, '75, '76, and '77.

Age.....	18.3 years.
Height.....	5 ft. 8 in. 67.974 in.
Weight.....	135 lbs. 134.981 lbs.
Chest (inflated).....	35 in. 35.067 in.
Chest (contracted).....	32 $\frac{1}{4}$ in. 32.29 in.
Fore-arm	10 in. 10.03 in.
Upper-arm (flexed).....	11 in. 10.960 in.
Shoulders (width).....	15 $\frac{1}{2}$ in. 15.602 in.
Hips.....	31 $\frac{1}{2}$ in. 31.475 in.
Thigh.....	19 $\frac{1}{2}$ in. 19.612 in.
Calf.....	12 $\frac{1}{2}$ in. 12.729 in.

TABLE II.

Showing the average state of the growth and development of the same number of men (200) after having practised in the Bowdoin Gymnasium half an hour a day four times a week, for a period of six months, under Dr. Sargent.

Height.....	5 ft. 8 $\frac{1}{4}$ in. 68.254 in.
Weight.....	137 lbs. 137.123 lbs.
Chest (inflated).....	36 $\frac{3}{4}$ in. 36.829 in.
Chest (contracted).....	33 in. 33.206 in.
Fore-arm	10 $\frac{3}{4}$ in. 10.760 in.
Upper-arm (flexed).....	12 in. 11.903 in.
Shoulders (width).....	16 $\frac{1}{4}$ in. 16.260 in.
Hips.....	33 $\frac{3}{4}$ in. 33.875 in.
Thigh.....	21 in. 20.964 in.
Calf.....	13 $\frac{1}{4}$ in. 13.232 in.

In this case the apparatus used was light dumb-bells, 2 $\frac{1}{2}$ lbs.; Indian clubs, 3 $\frac{1}{2}$ lbs.; pulley-weights, from 10 to 15 lbs.

TABLE III.

Showing average increase of 200 students at Bowdoin College, in various measurements, after working but half an hour a day four times a week, for six months, under Dr. Sargent.

Average increase in height.....	$\frac{1}{4}$ in.
Average increase in weight.....	2 lbs.
Average increase of chest (contracted).....	$\frac{3}{4}$ in.
Average increase of chest (inflated).....	$1\frac{3}{4}$ in.
Average increase of girth of fore-arm.....	$\frac{3}{4}$ in.
Average increase of girth of upper-arm.....	1 in.
Average increase of width of shoulders.....	$\frac{3}{4}$ in.
Average increase of girth of hips.....	$2\frac{1}{4}$ in.
Average increase of girth of thigh.....	$1\frac{1}{2}$ in.
Average increase of girth of calf.....	$\frac{3}{4}$ in.

TABLE IV.

Showing the effect of four hours' exercise a week for one year upon a youth of 19, at Bowdoin College, under Dr. Sargent's direction. This was two hours' work more each week than was required of the regular classes.

S—.	Age.	Height.	Weight.	Chest (infl.).	Chest (cont.).	Fore-arm.	Upper-arm.	Shoulders.	Hips.	Thigh.	Calf.
Date.	Yrs.	Ft. In.	Lbs.	In.	In.	In.	In.	In.	In.	In.	In.
Nov., '73.....	19	5 8	145	$36\frac{1}{2}$	$33\frac{3}{4}$	$10\frac{1}{4}$	$12\frac{1}{4}$	$15\frac{3}{4}$	35	$19\frac{3}{4}$	$13\frac{1}{2}$
Nov., '74.....	20	5 9	160	40	$34\frac{1}{4}$	11	$12\frac{3}{4}$	17	$36\frac{1}{2}$	22	15
Increase.....	..	1	15	$3\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{1}{2}$	$2\frac{1}{4}$	$1\frac{1}{2}$

The gain at four of the points taken—namely, at the calf, thigh, the inflated chest, and in weight—was great; yet see how little time it took, only forty minutes each day.

TABLE V.

Taken from Maclaren's "Physical Education." Showing effect of four months and twelve days' exercise, under his system, on fifteen youths ranging from 16 to 19 years of age.

RETURN OF COURSE OF GYMNASIC TRAINING AT THE ROYAL MILITARY ACADEMY, WOOLWICH, FROM FEB. 10TH, 1863, TO JUNE 22D, 1863.

No.	MEASUREMENTS, ETC.							INCREASE.					
	Age.	Height.		Weight.		Chest.	Fore-arm.	Upper-arm.	Height.	Weight.	Chest.	Fore-arm.	Upper-arm.
	Yrs.	Ft.	In.	St.	Lbs.	In.	In.	In.	In.	Lbs.	In.	In.	In.
1	18	5	1 $\frac{1}{4}$	7	8	29 $\frac{1}{2}$	9 $\frac{1}{2}$	8 $\frac{3}{4}$	1	"	$\frac{1}{2}$	"	$\frac{3}{4}$
2	19	5	2 $\frac{1}{4}$	7	8	30	9 $\frac{1}{2}$	9 $\frac{1}{2}$	1	"	$\frac{1}{2}$	"	$\frac{3}{4}$
3	17	5	8 $\frac{3}{4}$	9	5 $\frac{1}{2}$	28	11	10 $\frac{1}{4}$	$\frac{1}{2}$	5 $\frac{1}{2}$	3 $\frac{1}{2}$	"	1 $\frac{1}{8}$
4	18	5	8 $\frac{3}{4}$	9	11	31 $\frac{1}{2}$	11	11 $\frac{1}{2}$	$\frac{1}{2}$	5 $\frac{1}{2}$	3 $\frac{1}{2}$	"	1 $\frac{1}{8}$
5	17	5	5 $\frac{3}{4}$	9	1	26 $\frac{1}{2}$		8 $\frac{1}{2}$	$\frac{1}{2}$	5 $\frac{1}{2}$	3 $\frac{1}{2}$	"	1 $\frac{1}{8}$
6	18	5	6 $\frac{1}{2}$	9	1	29 $\frac{1}{2}$	10 $\frac{3}{4}$	10	$\frac{1}{2}$	5 $\frac{1}{2}$	3 $\frac{1}{2}$	"	1 $\frac{1}{8}$
7	18	5	8 $\frac{1}{4}$	10	0	33	10 $\frac{3}{4}$	10 $\frac{1}{4}$	$\frac{1}{4}$	3	2	"	1 $\frac{1}{4}$
8	18	5	8 $\frac{1}{2}$	10	3	35	10 $\frac{3}{4}$	11 $\frac{1}{2}$	$\frac{1}{4}$	3	2	"	1 $\frac{1}{4}$
9	18	6	0 $\frac{1}{2}$	10	13	32	10 $\frac{1}{2}$	9 $\frac{1}{4}$	$\frac{1}{2}$	3	2	"	1 $\frac{5}{8}$
10	17	5	1 $\frac{1}{4}$	11	2	34	10 $\frac{1}{2}$	10 $\frac{7}{8}$	$\frac{1}{2}$	3	2	"	1 $\frac{5}{8}$
11	17	5	3 $\frac{1}{2}$	8	1	31	10 $\frac{1}{8}$	9 $\frac{7}{8}$	1	6	2	"	1 $\frac{1}{8}$
12	18	5	4 $\frac{1}{2}$	8	7	33	10 $\frac{1}{8}$	11	$\frac{1}{2}$	6	2	"	1 $\frac{1}{8}$
13	18	5	5 $\frac{1}{4}$	7	13	26	9 $\frac{1}{4}$	7 $\frac{7}{8}$	$\frac{1}{2}$	3	3	$\frac{1}{4}$	1 $\frac{5}{8}$
14	16	5	5 $\frac{3}{4}$	8	2	29	9 $\frac{1}{2}$	9 $\frac{1}{2}$	$\frac{1}{2}$	3	3	$\frac{1}{4}$	1 $\frac{5}{8}$
15	16	5	6 $\frac{3}{4}$	8	3	28 $\frac{1}{2}$	9	8 $\frac{1}{2}$	$\frac{1}{2}$	3	3	$\frac{1}{4}$	1 $\frac{5}{8}$
16	17	5	7 $\frac{1}{4}$	8	4	31	9 $\frac{1}{8}$	9 $\frac{1}{2}$	$\frac{1}{2}$	1	2 $\frac{1}{2}$	$\frac{1}{8}$	1
17	17	5	8 $\frac{3}{4}$	11	3	31	11 $\frac{1}{4}$	10 $\frac{1}{4}$	$\frac{3}{4}$	"	2	"	$\frac{7}{8}$
18	18	5	9 $\frac{1}{2}$	11	3	33	11 $\frac{1}{4}$	11 $\frac{1}{8}$	$\frac{3}{4}$	"	2	"	$\frac{7}{8}$
19	18	5	11 $\frac{5}{8}$	11	8	30	10 $\frac{1}{4}$	10 $\frac{1}{2}$	"	"	3	$\frac{1}{2}$	$\frac{1}{2}$
20	18	5	11 $\frac{5}{8}$	11	8	33	10 $\frac{3}{4}$	11	"	"	3	$\frac{1}{2}$	$\frac{1}{2}$
21	19	5	7 $\frac{3}{4}$	10	2	33	10 $\frac{1}{2}$	10 $\frac{1}{4}$	$\frac{7}{8}$	"	1 $\frac{1}{2}$	"	$\frac{5}{8}$
22	18	5	8 $\frac{3}{4}$	10	2	34 $\frac{1}{2}$	10 $\frac{1}{2}$	10 $\frac{1}{8}$	$\frac{7}{8}$	"	1 $\frac{1}{2}$	"	$\frac{5}{8}$
23	18	5	10 $\frac{1}{2}$	10	11	32	10 $\frac{1}{2}$	10	1 $\frac{3}{8}$	"	1 $\frac{1}{2}$	"	1
24	19	5	11 $\frac{7}{8}$	10	11	33 $\frac{1}{2}$	10 $\frac{1}{2}$	11	1 $\frac{3}{8}$	"	1 $\frac{1}{2}$	"	1
25	19	5	7 $\frac{7}{8}$	11	13	33	11 $\frac{1}{2}$	12	1 $\frac{3}{4}$	"	2 $\frac{1}{2}$	"	$\frac{1}{2}$
26	19	5	9 $\frac{5}{8}$	11	13	35 $\frac{1}{2}$	11 $\frac{1}{2}$	12 $\frac{1}{2}$	1 $\frac{3}{4}$	"	2 $\frac{1}{2}$	"	$\frac{1}{2}$
27	17	5	6 $\frac{3}{4}$	9	13	29	10 $\frac{5}{8}$	8 $\frac{1}{4}$	$\frac{7}{8}$	4	3	"	1 $\frac{1}{4}$
28	19	5	7 $\frac{3}{8}$	10	3	32	10 $\frac{5}{8}$	9 $\frac{1}{2}$	$\frac{7}{8}$	4	3	"	1 $\frac{1}{4}$
29	19	5	10 $\frac{1}{2}$	10	1	27 $\frac{1}{2}$	10 $\frac{5}{8}$	9 $\frac{3}{8}$	1 $\frac{3}{8}$	8	5 $\frac{1}{4}$	"	1 $\frac{1}{2}$
30	19	5	11 $\frac{7}{8}$	10	9	32 $\frac{3}{4}$	10 $\frac{5}{8}$	10 $\frac{7}{8}$	1 $\frac{3}{8}$	8	5 $\frac{1}{4}$	"	1 $\frac{1}{2}$

TABLE VI.

Taken from Maclaren's "Physical Education." Showing effect of seven months and nineteen days' exercise, under his system, on men ranging from 19 to 28 years of age.

TABLE OF MEASUREMENTS OF FIRST DETACHMENT OF NON-COMMISSIONED OFFICERS SELECTED TO BE QUALIFIED AS MILITARY GYMNASIC INSTRUCTORS.

Date.	No.	MEASUREMENTS, ETC.									INCREASE.				
		Age.	Height.		Weight		Chest.	Fore-arm.	Upper-arm.	Height.	Weight.	Chest.	Fore-arm.	Upper-arm.	
			Yrs.	Ft.	In.	St.									Lbs.
Sept. 11...	1	19	5	8 $\frac{1}{2}$	9	2	33	9 $\frac{1}{2}$	10						
April 30..			5	8	10	1	37 $\frac{1}{2}$	10 $\frac{1}{2}$	11 $\frac{3}{4}$	$\frac{3}{4}$	13	4 $\frac{1}{2}$	1	1 $\frac{3}{4}$	
Sept. 11...	2	21	5	9	10	5	34 $\frac{3}{4}$	10	11						
April 30..			5	9 $\frac{1}{4}$	11	1	38 $\frac{1}{2}$	11	12 $\frac{1}{4}$	$\frac{1}{4}$	10	3 $\frac{3}{4}$	1	1 $\frac{1}{4}$	
Sept. 11...	3	23	5	5	9	7	34	10 $\frac{1}{2}$	12						
April 30..			5	5 $\frac{3}{4}$	10	2	37 $\frac{1}{2}$	11 $\frac{1}{2}$	13 $\frac{1}{4}$	$\frac{3}{4}$	9	3 $\frac{1}{2}$	1	1 $\frac{1}{4}$	
Sept. 11...	4	23	5	7 $\frac{1}{4}$	9	13	37	10 $\frac{1}{4}$	12						
April 30..			5	7 $\frac{3}{4}$	10	8	38 $\frac{1}{2}$	11 $\frac{1}{2}$	13	$\frac{1}{2}$	9	1 $\frac{1}{2}$	1 $\frac{1}{4}$	1	
Sept. 11...	5	23	5	8 $\frac{1}{4}$	9	10	36	10	11						
April 30..			5	8 $\frac{1}{2}$	10	6	37	10 $\frac{1}{2}$	12	$\frac{1}{4}$	10	1	$\frac{1}{2}$	1	
Sept. 11...	6	23	5	9 $\frac{1}{8}$	11	3	36 $\frac{1}{2}$	11	12						
April 30..			5	9 $\frac{1}{4}$	11	12	38 $\frac{1}{2}$	11 $\frac{1}{2}$	13	$\frac{1}{8}$	9	2	$\frac{1}{2}$	1	
Sept. 11...	7	23	5	9	10	6	36	10 $\frac{3}{4}$	12						
April 30..			5	9 $\frac{1}{8}$	10	11	38 $\frac{1}{2}$	11	13	$\frac{1}{8}$	5	2 $\frac{1}{2}$	$\frac{1}{4}$	1	
Sept. 11...	8	24	5	8 $\frac{3}{4}$	10	8	35	10 $\frac{3}{4}$	12 $\frac{3}{4}$						
April 30..			5	9 $\frac{1}{4}$	11	6	40	11 $\frac{3}{4}$	14	$\frac{1}{2}$	12	5	1	1 $\frac{1}{4}$	
Sept. 11...	9	26	5	6 $\frac{1}{4}$	9	5	33	10	11 $\frac{1}{2}$						
April 30..			5	6 $\frac{7}{8}$	9	11 $\frac{1}{2}$	36	10 $\frac{1}{4}$	12 $\frac{3}{4}$	$\frac{5}{8}$	6 $\frac{1}{2}$	3	$\frac{1}{4}$	1 $\frac{1}{4}$	
Sept. 11...	10	26 $\frac{3}{4}$	5	11 $\frac{3}{8}$	12	6	41	11 $\frac{1}{2}$	13						
April 30..			5	11 $\frac{3}{4}$	13	1	42	11 $\frac{1}{2}$	14	$\frac{3}{8}$	9	1	"	1	
Sept. 11...	11	28	5	7 $\frac{1}{4}$	10	10	37	10 $\frac{1}{2}$	12 $\frac{1}{2}$						
April 30..			5	8 $\frac{1}{4}$	11	9	40	11 $\frac{3}{4}$	13 $\frac{3}{4}$	$\frac{1}{2}$	13	3	1 $\frac{1}{4}$	1 $\frac{1}{4}$	
Sept. 11...	12	28	5	10 $\frac{7}{8}$	10	9	37	10 $\frac{1}{2}$	13						
April 30..			5	11	11	11	40	11 $\frac{3}{4}$	14	$\frac{1}{8}$	16	3	1 $\frac{1}{4}$	1	

The men composing this detachment had been irregularly selected, the youngest being 19, the eldest 28, the average age 24; and, after a period of *eight months'* training, the increase in the measurements of the men were—

	Weight.	Chest.	Fore-arm.	Upper-arm.
	Lbs.	In.	In.	In.
The smallest gain.....	5	1	1 $\frac{1}{4}$	1
The largest gain.....	16	5	1 $\frac{1}{4}$	1 $\frac{1}{4}$
The average gain.....	10	2 $\frac{7}{8}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$

TABLE VII.

Taken from Maclaren's "Physical Education." Showing the result of one year's continuous practice.

THE FOLLOWING TABLE SHOWS IN ANOTHER FORM THE RESULTS OF THE SYSTEM; NOT BY BRIEF COURSES OR PERIODS OF VOLUNTARY ATTENDANCE, BUT BY A YEAR'S STEADY PRACTICE FROM BIRTHDAY TO BIRTHDAY, WITH TWO ARTICLED PUPILS, THE YOUNGER BEING 16, THE ELDER 20.

Case.	Date.	MEASUREMENTS, ETC.						INCREASE.				
		Age.	Height.	Weight.	Chest.	Fore-arm.	Upper-arm.	Height.	Weight.	Chest.	Fore-arm.	Upper-arm.
A.	1861, Oct. 17.	16	5 2 $\frac{3}{4}$	7 10	31	8	9 $\frac{1}{4}$					
	1862, Apr. 17.	"	5 4	8 12	34 $\frac{1}{2}$	10	11 $\frac{1}{4}$	1 $\frac{1}{4}$	16	3 $\frac{1}{2}$	2	2
	" Oct. 17.	17	5 4 $\frac{1}{4}$	9 3	36	10	11 $\frac{1}{4}$	1 $\frac{3}{4}$	5	1 $\frac{1}{2}$	"	"
					Subsequent Measurement.							
	1863, Mar. 23.	18	5 6 $\frac{3}{8}$	10 10	37 $\frac{1}{2}$	11 $\frac{1}{4}$	13	1 $\frac{5}{8}$	21	11 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$
B.	1862, Feb. 24.	20	5 8 $\frac{1}{2}$	10 13	34	11 $\frac{1}{4}$	11 $\frac{3}{4}$					
	" Aug. 24.	"	5 8 $\frac{7}{8}$	11 4	38 $\frac{1}{2}$	12	12 $\frac{3}{4}$	3 $\frac{1}{8}$	5	4 $\frac{1}{2}$	3 $\frac{1}{2}$	1
	1862, Feb. 24.	21	"	11 7 $\frac{1}{2}$	40	12 $\frac{1}{2}$	13 $\frac{1}{4}$	"	3 $\frac{1}{2}$	11 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$

Thus in the year's work the increase was—

	Height.	Weight.	Chest.	Fore-arm.	Upper-arm.
	In.	Lbs.	In.	In.	In.
With the younger...	2	21	5	2	2
With the elder.....	3 $\frac{3}{8}$	8 $\frac{1}{2}$	6	1 $\frac{1}{4}$	1 $\frac{1}{2}$

A stone is fourteen pounds. The gain in weight by the younger, and the increase in girth of chest by both, seem almost wonderful.

APPENDIX VIII.

TABLE OF MEASUREMENTS OF ; SHOWING
THE ANNUAL INCREASE IN THE SIZE OF THE BODY AND LIMBS,
AND THE EFFECT OF DAILY SYSTEMATIC EXERCISE WHILE AT THE
..... SCHOOL :

Name of Boy.													
Date.	Age.	Height.	Weight.	Chest. (inflated.)	Chest. (natural.)	Right Upper- arm.	Left Upper- arm.	Right Fore- arm.	Left Fore- arm.	Waist.	Hips.	Thigh.	Calf.
1st, 188	Yrs.	Ft. In.	Lbs.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
" " 188													
Increase....													
1st, 188													
" " 188													
Increase....													
1st, 188													
" " 188													
Increase....													
1st, 188													
" " 188													
Increase....													

NOTE.—Make all the entries in ink.

Take the height in ordinary shoes.

Take the weight in ordinary clothes, without overcoat.

Measure the chest around close under the arms.

Measure the upper-arm around the largest part when the arm is in the position of Fig. 4, page 16.

Measure the fore-arm around the largest part when the fist is shut.

Measure the thigh and calf at the largest part of each.

APPENDIX IX.

TABLE OF MEASUREMENTS OF _____; SHOWING
THE ANNUAL INCREASE IN THE SIZE OF THE BODY AND ARMS,
AND THE EFFECT OF DAILY SYSTEMATIC EXERCISE WHILE AT THE
_____ SCHOOL.

Name of Girl.									
Date.	Height.	Weight.	Chest (inflated).	Chest (natural).	Right Upper- arm.	Left Upper- arm.	Right Fore- arm.	Left Fore- arm.	Waist.
1st, 188	Ft. In.	Lbs.	In.	In.	In.	In.	In.	In.	In.
" " 188									
Increase....									
1st, 188									
" " 188									
Increase....									
1st, 188									
" " 188									
Increase....									
1st, 188									
" " 188									
Increase....									

NOTE.—Make all the entries in ink.

THE END.



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